VOL. XXVII. No. 10 OCTOBER 1942

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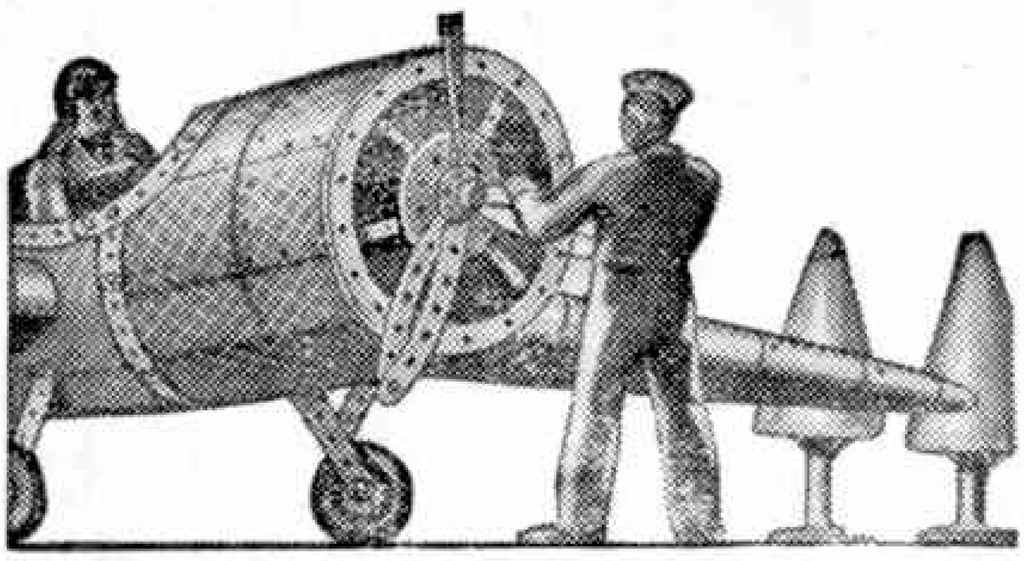

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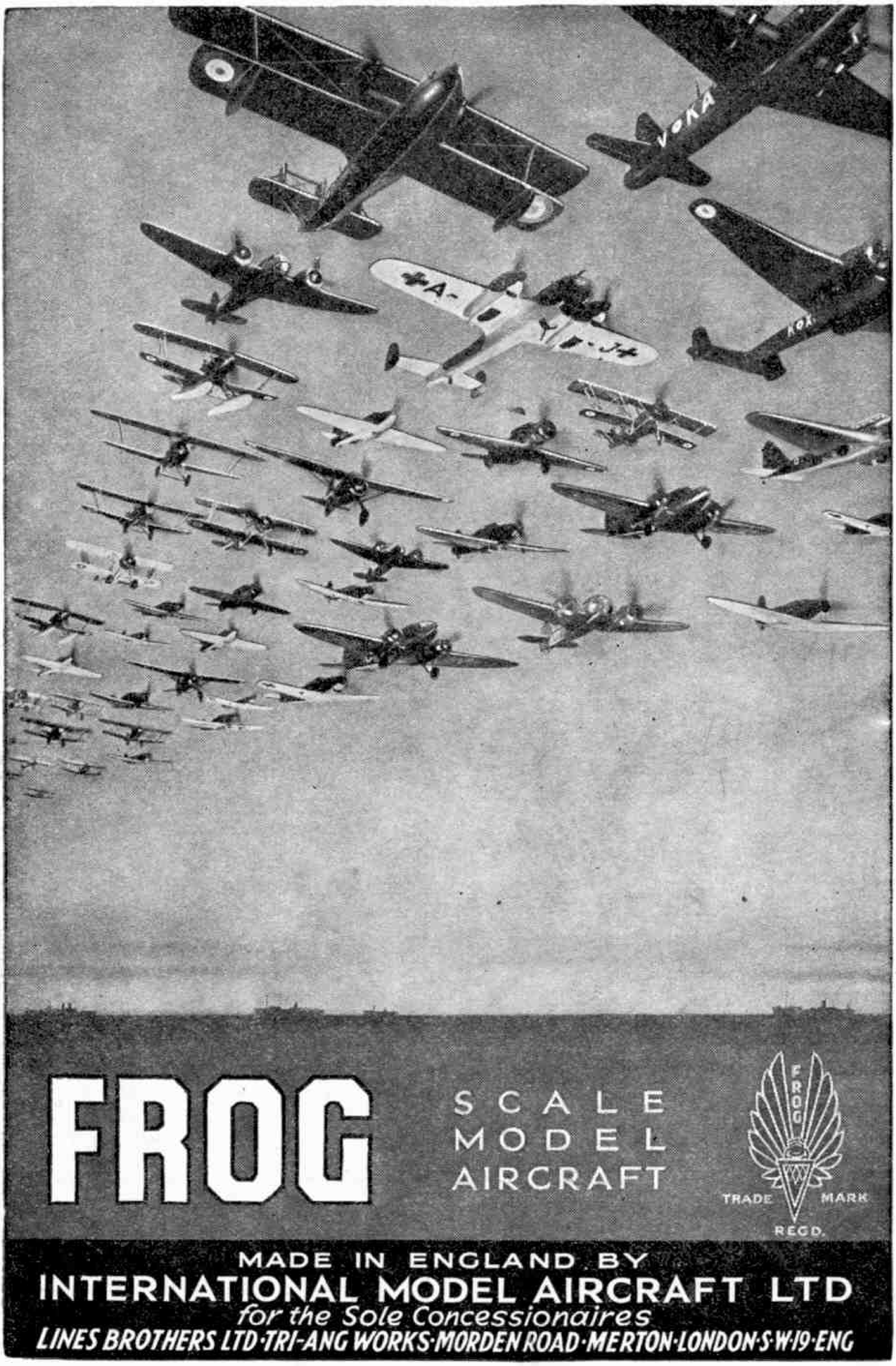
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2
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3
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Editorial Office:
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Vol. XXVII
No. 10
October 1942

With the Editor

"Old Glory"

I think all readers will be interested in the article on *"Old Glory"* on page 347. This striking and brilliant flag has many unusual features. It is essentially a people's flag, representing equally the whole country and every part of it. Many people in this country fail to realise the length of time covered by the 48 stars. This period extends from December 1787, the date of admission to the Union of the States of Delaware, Pennsylvania and New Jersey, to 1912, in which year were added the States of New Mexico and Arizona. The name *"Old Glory"* was given to the flag on 10th August 1931 by Captain William Driver of the brig *"Chas. Doggett."*

Brain Teasers

The story about the *"Apples Unlimited"* in last month's *"Fireside Fun"* has led many readers to ask for more items of this kind in place of jokes. I think this is a good idea, and this month I give the first three of a series of *"Brain Teasers."* The solutions to these problems will be given in next month's *"Fireside Fun."*

Readers who know of any good things of this kind are invited to send them along with a view to publication.

Leaders in the War

Marshal Semyon Timoshenko

Marshal of the Soviet Union and Hero of the Soviet Union, Semyon Timoshenko was born in Bessarabia, son of a farmer, 47 years ago. During the Civil War in Russia he took an active part in the creation and organisation of the First Cavalry Army. As commander of a regiment he heroically defended Tsaritsin, smashing the enemy's armies under the White Generals Krasnov and Mamontov. As commander of the Sixth and then the Fourth Cavalry Division he led the Red Army from victory to victory.

Marshal Semyon Timoshenko.

He was elected by the First Cavalry Army as delegate to the Eighth Congress of Soviets in 1920, and it was there that he first met Lenin.

Timoshenko was Commander of the Kiev Military Area until his appointment as People's Commissar of Defence of the U.S.S.R. in 1940, which position he held until the attack of Hitlerite Germany on the Soviet Union, when he was placed in command of one of the fighting fronts. This courageous commander and fighter has well earned his place among the gifted strategists of the Soviet Army.

Asbestos versus Fire

IT would be almost impossible to enumerate all the uses of the remarkable substance known as asbestos. It is made into fabrics for fire-proof clothing and gloves, theatre curtains and blankets. It is used for the insulation of boilers and steam pipes, and is largely employed also for brake linings and gaskets. In addition it has wide applications as an insulator against sound. For this purpose it is used on the London Underground Railways, and the L.N.E.R. "Coronation" trains had their body-sides and roof insulated with asbestos blanket. In the form of yarn and tape it is used for the electrical insulation of cables. There are at least 18,000 catalogued articles made of asbestos.

Demonstration of the protection given by asbestos suit. The illustrations to this article and the photograph on which the cover is based are by courtesy of Bell's Asbestos and Engineering Ltd.

Over 60 per cent. of the world's normal demand for asbestos was met by the British Empire. Canada, Southern Rhodesia, the Union of South Africa, Australia, Tasmania and New Zealand are our main sources of supply of this mineral wealth. For asbestos is a mineral, and not a vegetable fibre as is so often supposed. It is rock of volcanic origin which is known as Olivin, and the method of manufacture reads like a fairy tale of industry. In the remote past natural chemical action caused the volcanic olivin to change its form and to swell into a gelatine-like substance containing a considerable quantity of latent water. As the generations went by, the water content decreased and dried slowly, as wet clay dries, leaving cracks and crevices. Fibres, set free from the watery solution, grew from the sides of the crevices. It is from these fibres that the finished product known to the world as asbestos is made.

The beginning of the complicated process is the quarrying or mining of the rock. This is done very much in the way that coal is obtained from the earth; and as coal is graded, so is the crude rock. That containing long fibres is separated from that with short fibres, and then giant crushing machines crumble the rock, yet leave the delicate silk-like fibres undamaged, to be removed by compressed air. The long fibres are then carded and eventually spun into yarn that can be twisted into rope or woven into cloth. Asbestos with fibres too short for spinning is pulped to paper or pressed into felt and boards. In whatever form it is used it retains its fire resisting, acid resisting, and heat and sound insulating qualities.

The most spectacular development of recent years has been the provision of asbestos suits for the Royal Air Force and the Fleet Air Arm. These suits are two-piece, and when flying is in progress at an aerodrome or from an aircraft carrier, men specially detailed wear the lower portion. If a crash occurs and fire breaks out, they quickly slip on the top portion and are ready for rescue work. The remarkable efficiency of the type supplied to the Services by Bell's Asbestos and Engineering Ltd. has been made possible only after a long period of exacting and often hazardous tests. There were, of course, theoretical experiments in laboratories to discover the resistance of certain combinations of materials to the effect of heat generated by fire, but this was not enough, and did not satisfy Bell's. The firm demonstrated their confidence in their product by practical experiment, and men wore the suits to operate in fire conditions often appreciably more severe than were likely

to be encountered in actual practice.

Nothing could have been more convincing than a demonstration given to certain officials in order to substantiate the claims of the asbestos suits. A man wearing the equipment sat in the cockpit of a skeleton aircraft, which was then set on fire. In two minutes he was literally engulfed in flames, with the temperature at 1,500 degrees Fahrenheit. After four minutes he walked out through the flames, absolutely unharmed.

But, convincing though this is, it does not follow that anyone can wear an asbestos suit and stroll into a fierce fire with impunity! The value and trustworthiness of the equipment has been proved beyond all doubt; the human element is the deciding factor as to the uses to which it can be put. Individual endurance and reactions govern the application. The fighting Services are most careful in their selection of personnel, and a training method has been elaborately evolved. Absolutely necessary essentials are steadiness in emergency, initiative, neatness in working, activity of body, courage and physical strength. All these attributes are needed, for to find oneself in the centre of leaping flames may well prove a decidedly disconcerting and unnerving ordeal.

Close-up of asbestos suits.

The first sensation is of a slight warmth through the visor. Exertion quickens the breathing and a general warmth is soon apparent. If the flames are lapping, the man's legs will get really warm, but slight movement will minimise discomfort if the flames play continuously on one or more parts of the suit. Stooping or bending produces a rush of air into the helmet and "roaring" in the ears, but the trained man is not perturbed by this. The importance attached to training has been justified by the fact that there is no record of a mishap to a wearer who properly carried out instructions. This inspires such confidence in the protection afforded that extraordinarily good work can be done under even the most serious and alarming conditions. The wearer has no worry about his equipment letting him down, and so he can concentrate entirely on the job in hand.

When Bell's train a man to become such a fire-fighter, he is first of all impressed that he is undergoing no endurance competition, and he has a deal to go through before actually entering a fire. After becoming accustomed to the suit, the man wears it while doing simple physical exercises. He walks and runs, and uses such tools as a hack saw on a pipe; he screws taps to pipes, makes fast a wire rope with a shackle and screwed pin, and manipulates a pump. Such obstacles as beams, ropes, wires, boxes and sand bags are placed in his path for him to negotiate, and in many similar ways he is initiated into tasks likely to require attention under conditions of stern reality. The various tests are timed, and the man's temperature, pulse, blood pressure and respiration are taken before and after each phase. Only when his suitability appears thoroughly established is the trainee permitted to enter fire. The "baptism" is usually supplied by igniting a pile of easily combustible material sprinkled liberally with petrol, through which the wearer of the suit walks.

Empire Air Forces and some municipal fire brigades are also utilising such suits, and this is but a fraction of the ground covered by asbestos materials on the front that is concerned with personal and property safety and protection. Asbestos blankets and "snuffers" for extinguishing incendiary bombs form part of the equipment of A.R.P. squads; there are asbestos shields and screens, large and small, for isolating fires in factories and in aircraft hangars; and housewives, like engineers and chiefs of the fighting Services, now appreciate the qualities of this fire-proof substance and are equipping their houses with asbestos curtains and patterned upholstery.

The L.M.S. Turbomotive No. 6202

Notes on Footplate Trips

By E. M. Livesay

IF you were to ask the first hundred people you met—other than readers of the "*M.M.*" of course!—"Who invented the locomotive"? probably 99 of them would say "Stephenson," and that the "*Rocket*" was his first production. They would be wrong, of course; nevertheless the Stephensons, father and son, were the first to build a locomotive that had in it a sure foundation for future development, and which showed quite definitely that the steam-engine was an advance on the horse so far as rail transport was concerned. It combined in one engine features that at once set the fashion to the locomotive world; that have come down in a direct line of descent to this day, and remain with us still. Two of the most important of these features are the tubular boiler, and a direct drive from piston to axle.

Since the "*Rocket*" first proved the locomotive's case at the Rainhill trials in 1829, tremendous and continuous advances have been made, yet the great majority of locomotives still incorporate the main points of that famous engine, and it seems unlikely that very much further progress can be made unless a complete break is made with the old basic design, if I may call it that. This has apparently reached the limit of its development, and only detail advances can be looked for. So engineers, in their ceaseless search for increased efficiency and better performance, are turning their attention to directions that at long last take us away from what one may term the Stephenson type of engine, and are experimenting with engines of altogether different design. Some of these have already been tried and found wanting, but others are still running, and only time can prove whether or not they have the germ of success in them. One of the latter is the L.M.S. turbine engine No. 6202, a most interesting design that deserves a better fate than has befallen other promising machines on which their designers' hopes were centred.

The L.M.S. Turbomotive No. 6202 hauling the up "Merseyside Express." Photograph by the Rev. E. Treacy.

Very little has been said hitherto about No. 6202, so perhaps "*M.M.*" readers may like to hear something about it. This account is based on a couple of runs made in the cab between London and Liverpool, a few days before the outbreak of war.

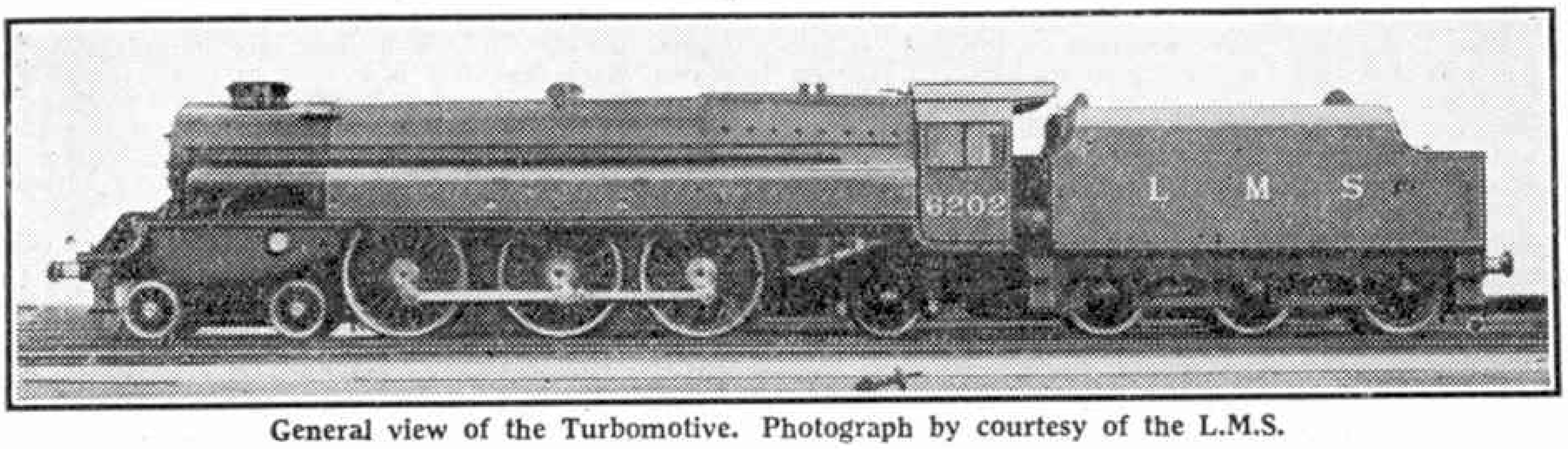
No. 6202 is the only engine of its type in the world, and this fact makes it all the more worth studying. It has separate non-condensing turbines for forward and backward running, direct geared to the driving axle; that is to say, a train of gear-wheels transmits the power from turbines to driving-axle, without the use of either electric or coupling-rod intermediaries. It is really an L.M.S. "Princess Royal" class engine, with the four cylinders of that class removed and turbines substituted. The multi-stage ahead turbine is placed outside the frame on the left, where the outside cylinder of the "Princess Royal" would be found; the reverse impulse turbine is on the opposite side, in a similar position, the necessary cross-shafts and gearing lying between the frames, in the space that would be occupied by the inside motion of the reciprocating engine. The first coupled axle takes the drive, and the wheels are 6 ft. 6 in. in diameter, as in the "Princess Royal" class.

As the turbines revolve at very high speed—over 13,000 revolutions per minute at 90 m.p.h.—they have to be geared down drastically, the reduction being 34.3 to 1 in the case of the ahead turbine, made in three steps, and an even greater reduction for the reverse turbine, an additional reduction, four in all, being employed for the latter. The ahead turbine develops 2,500 h.p., the reverse turbine less, as it is only used for shunting and running light, when high power is not needed. All the gearing is enclosed in a dust-proof case, the shafts and gears being lubricated by a submerged gear-pump in the sump, and by a Worthington pump placed ahead of and below the forward-motion turbine. This Worthington pump also circulates the oil through a radiator situated below the smoke-box door.

The ahead turbine is always in gear, and therefore revolves in whichever direction the engine may be moving. The reverse turbine, however, has to be brought into gear when necessary for backward running, and this is done by a dog clutch that cannot be engaged unless the engine is stationary. The gear-case is fixed to the frames, and the gears being integral with it, spring-action in the driving-axle is allowed for by a quill drive, similar to that employed on electric locomotives.

The boiler and fire-box dimensions are the same as those of the "Princess Royals"; the heating surface is 2,168 sq. ft., that of the superheater being 832 sq. ft. and the grate area 45 sq. ft. A dome is now fitted, with the regulator in it, but originally the boiler was domeless and the regulator was in the smoke-box. The steam pressure is 250 lb. The chimney is double, and this of course calls for twin blast-pipes, in the nozzles of which cones are fitted to intensify the blast, which with turbines is naturally very soft. Because of this, too, deflector-plates are now found beside the smoke-box; they were not fitted at first.

The controls in the cab are naturally different from those on the usual type of engine. The regulator is used only as a stop-valve, and is kept fully open when the engine is running, speed and power being varied by a handle on what is called the control-box, placed on the left or driver's side of the cab, where the reverse-wheel is to be found on a reciprocating engine. This handle is turned to the right, clockwise, for going ahead, and anti-clockwise for backward running; it opens and closes six valves in succession



General view of the Turbomotive. Photograph by courtesy of the L.M.S.

on the ahead turbine, and three on the reverse. These valves direct the steam to groups of nozzles in the turbines, from which it impinges on the blades. There is also a reversing handle on the control-box, to engage the clutch bringing the reverse-turbine into gear; a safety handle, which must be in the locking position before the reverse turbine can be engaged, and then moved to the running position. On top of the box is a valve tell-tale, a pointer moving along a slot past six ahead and three astern notches, in front of and behind a neutral mark respectively.

It has taken some time to describe these unusual features, but No. 6202 is so different from a reciprocating engine that it is necessary if the reader is to understand her. Other points will come up later—now let us get to the runs.

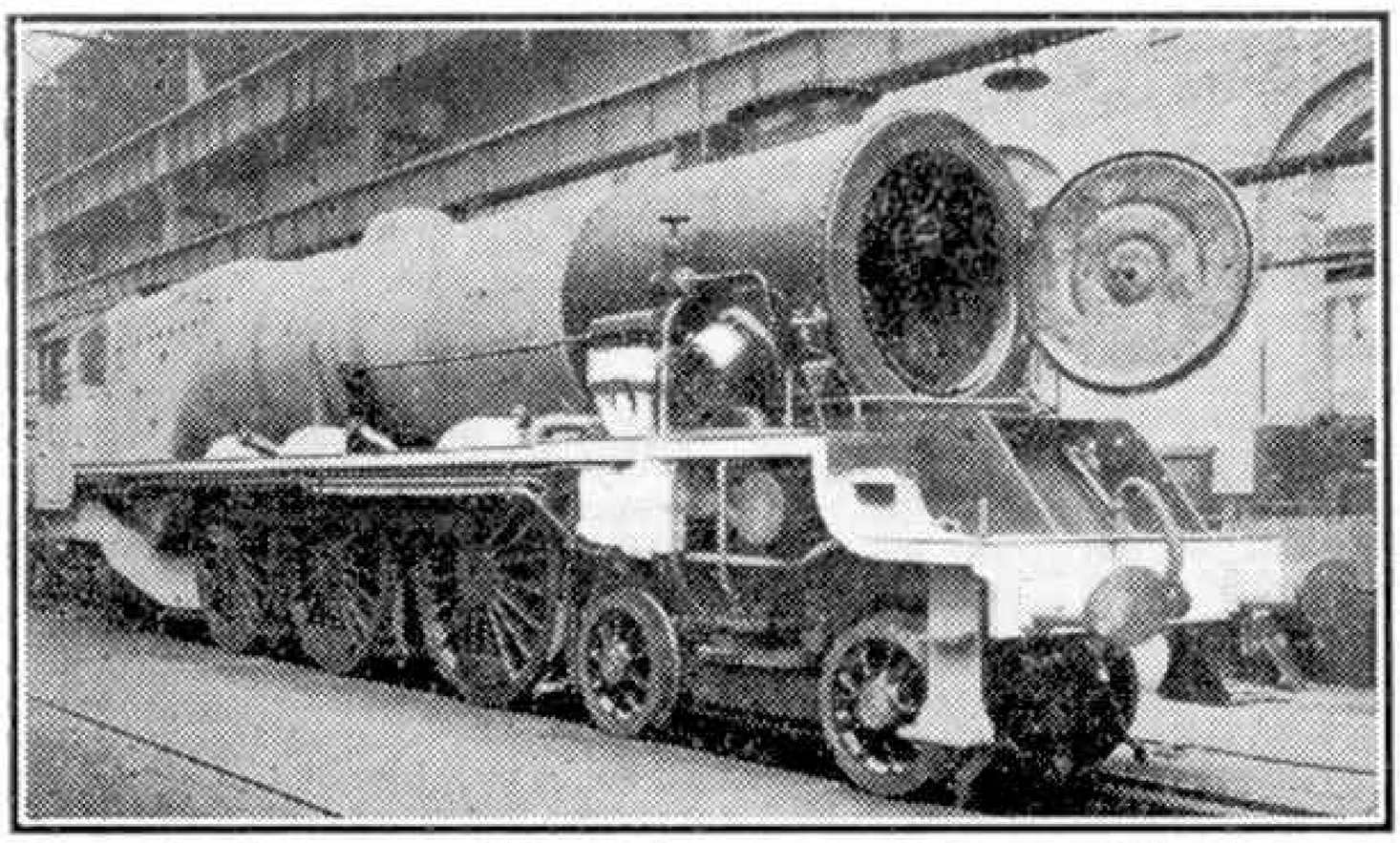
I picked up the engine at the Camden Shed to have a good look round before train-time, but there was so much to note that I was not nearly finished when she pulled out for Euston, tender first, which made it necessary to use what is known as the "inching-gear," a device that gives the reverse turbine shaft ½ a tooth turn if the dogs on the two halves of the clutch happen to have come to rest opposite each other, and will not engage. It is quite simple to use, and its handle is also on the control-box.

Directly we got under way I noticed how smooth was the motion of No. 6202. There was no thud, clank or rattle—nothing but a silky progression. We moved, but could not tell why! The exhaust, with only one valve open, was inaudible. Arrived at Euston, we backed on to the 10.40 a.m. Liverpool train, which weighed about 400 tons, and I had time to go round the engine with Fitter Whiston on a last-minute inspection, and also to note some more of the fittings in the cab. The enginemen were Driver Worman and Fireman Ruffell. There were several unusual gauges, indicating the steam-chest pressure, oil pressure, back-pressure in the exhaust, temperature of the oil before and after passage through the cooler (radiator), in addition to the usual tell-tales. A liquidometer showed the amount of oil in the gear-box sump. It was all very interesting, and I saw there was going to be no time for wool-gathering if I meant to keep track of everything.

The green flag gave us the right away dead on time, at 10.40 a.m., and two valves were open for the start, which was made with no slipping and called for no sand. Of course the engine that had brought the train into the station gave a "boost" up the Camden incline, which begins at once outside Euston station. It is nearly a mile long, and has a gradient of 1 in 70 to 1 in 112. It was a novel experience, climbing this steep bank with hardly any sound from the front end, only a continuous rustle, as it were, from the chimney instead of the staccato beats heard from the ordinary type of engine—a sound so characteristic of the locomotive. There was a musical singing note from the turbine pinion, too, just at the start, which rose in a high whine, and died out at about 15 m.p.h. The speed had risen to about 35 m.p.h. at the top of the bank, and Willesden, 5½ miles, was passed in 9½ min., at 60 m.p.h. The continuous draught of the turbine exhaust was quite soft, but the "blinkers" took the steam well clear of the cab windows. Then came the long Tring incline, which was taken at a steady 60 m.p.h., the station, nearly 32 miles from Euston, being run through at 11.17½ a.m., that is 37½ min. from the start. Though the high-pitched singing note had disappeared, I noticed at speed a deep, very musical hum from the gear-train. It was far from obtrusive, but you could hear it if you listened closely. As a result of this, enginemen have given No. 6202 a nick-name—"*Gracie Fields*"; "she sings as she goes."

Over the top and down to Cheddington the speed rose to 75, with only one valve open. The engine was riding well, and I had got used to the absence of all knock and rattle, generally more or less in evidence with reciprocating engines. I have never been on an engine with which the steam-pressure held so steady; it was generally close to 245 lb., very near blowing-off point, and Ruffell had quite an easy time of it.

After leaving Kilsby tunnel the engine drifted down to Rugby, and we ran through at 12.04½ p.m., 1½ min. early, having covered the 82½ miles at an average speed of 58.5 m.p.h. Only once had the speed risen as high as 75; generally it had been about 65, varying very little. Stafford was passed at 12.57 or 2 min. early, and we jogged along on one valve into Crewe, the 24.5 miles thereto having taken 33 min., averaging 44.5, coming to a stand at 1.30 p.m. The 158 miles from Euston had been covered in 170 min.



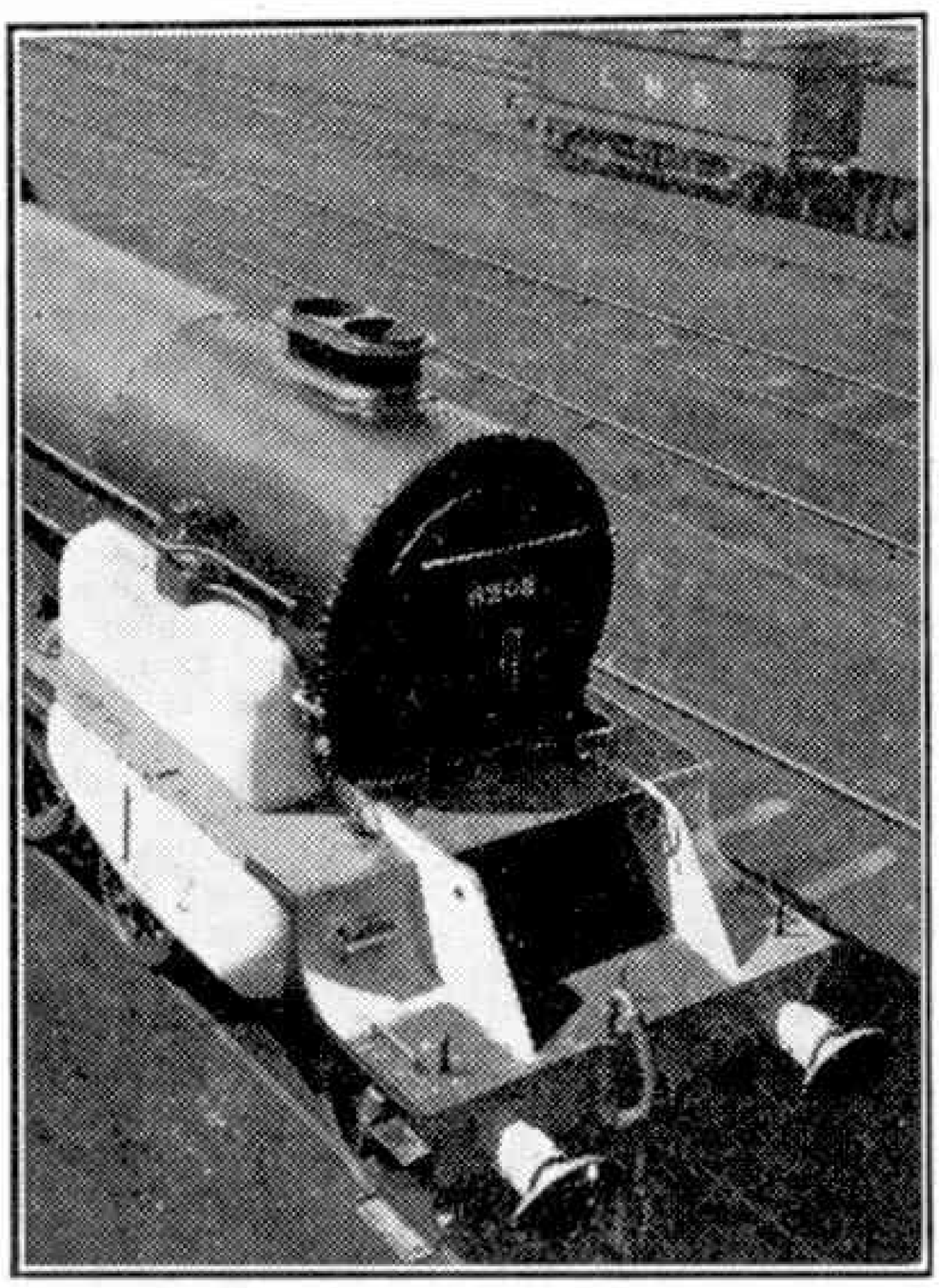
The engine before completion in the works at Crewe. This photograph shows the reverse turbine above the second bogie wheel and the steam nozzles alongside the smoke-box before the fitting of the casing that covers these parts. Photograph by courtesy of "The Railway Gazette."

average speed 55.8.

The start from Crewe was made on two valves, but one was sufficient on the falling gradient to Weaver Junction. The 3-mile climb to Sutton Weaver, culminating in 1 in 101, called for three valves, after which things were taken very easily along the somewhat tricky stretch into Lime Street station, reached at 2.15½ p.m., 2½ min. before time. The 193.5 miles from Euston had been made at an average speed of 53.9 m.p.h., inclusive of the stop at Crewe. I was very pleased with the turbine engine's performance, but she had had no chance to show her mettle, as neither the load nor the timing imposed any real task on such a powerful engine.

The approach to the Shed is, as many "*M.M.*" readers no doubt know, somewhat difficult. It calls for several reversals and there are heavy gradients, so I went there with the engine to see how she manœuvred. There was no trouble; the inching-gear came into action once or twice, making things simple; without it the engine's handling might have been more awkward. It is a later addition, put on since the engine was first turned out.

The return trip was made a couple of days later. I joined the engine at Lime Street station on her arrival from London, as I was still interested in her controllability. A long straight-away run gives one no means of gauging this, whereas shunting and shed work do. I also wanted to look again into some of the unusual fittings. The Worthington oil-pump, for instance; this is often kept working when the engine is standing, passing the oil through the cooler, sometimes misleading the onlooker into thinking a Westinghouse brake is fitted. The engine was held an unusually long time at Lime Street—about ¾ of an hour, if I remember rightly—and so "shed-time" had to be cut down very considerably. This resulted in hurried fire-cleaning, and a steam-pressure of only 210 lb. when we finally pulled out for the South at 5.28 p.m., 3 min. late. The crew were Driver Eborall, Fireman Jones and Fitter Parker.



Reverse turbine side of the locomotive, showing the double chimney. Photograph by courtesy of "The Railway Gazette."

Outside the station there is an incline of 1 in 93, on which four valves were open, the load being 425 tons. No slipping occurred, though there was no "banker" at the rear as there had been at Euston. Only by looking at the coupling-rods, which I was doing, would it be possible to tell if slipping was taking place, I should imagine. An extra stop was made at Edge Hill, and a signal check at Allerton brought the speed down to 10 m.p.h. For various reasons—signals, Halebank water-trough, the Runcorn bridge, permanent-way repairs, etc.—the speed fluctuated a good deal, and the fire was not yet built up. The pressure was falling instead of rising; near Sutton Weaver it had gone back to 160 lb. The sand-gun was turned on here, a device standard on modern L.M.S. engines. The turning of a wheel just over the fire-door directs a stream of sand in an increasing spiral over the tube-plate, removing any caked clinker from it, and passing on through the tubes scours them too. The pressure now began to rise slowly, and I expected that the Crewe stop would give it a chance to reach the full 250 lb. working figure. Evidently it is a slow business to raise the steam when the blast is so soft as is the case with No. 6202, and Jones was quite concerned. So was everyone in the cab, in fact, but nothing could be done about it. Originally the cones in the twin blast-pipes were raised or lowered automatically according to the number of valves open—the fewer the valves open, the lower the cones, and the sharper the blast—but now they are fixed in approximately the best running position, and the blast simply corresponds to the number of valves in operation.

The Crewe stop was made at 6.18½ p.m. It had been a rather trying piece of running, with frequent interference, and the low steam pressure had not added to the happiness of anyone in the cab. We left Crewe at 6.24 p.m., 12 min. late; again two valves were open, and the pressure up to 225 lb. There is a long 10-mile rise to the Whitmore troughs, which was covered in 14 minutes; over the peak at 60 m.p.h., and down the falling gradient to Stafford steam was nearly shut off, the speed rising to 75 m.p.h. I felt that now there was a certainty of working pressure being attained and so it was; running through Great Bridgeford the safety-valves popped, so at long last the needle was quivering on the 250 lb. line. An hour-and-a-half had been needed to get it up to blowing-off point, probably due to the low exhaust-pressure, which may only have been 2 lb. or 3 lb. at times.

We were interfered with once or twice nearing Lichfield, having caught up to something in front, but when it was shunted out of the way the speed rose rapidly. The 25 miles after Lichfield were covered at an average of 70; down grade to Brinklow 80 was reached, but in spite of this Rugby was passed at 7.41 p.m., 17 min. late. Farther on, after Kilsby tunnel, there is a fall to Weedon, during which 80 was again touched; from Roade to Wolverton there is another drop, and we ran through Castlethorpe at 83—incidentally the highest figure I have ever noted on any of my footplate trips over L.M.S. metals, with all the "Scots," and in Scotland. Please do not think I am claiming that this is the highest speed that ever *is* reached by these trains—it merely happens to have been so when I was observing on the footplate. At these high speeds the riding of No. 6202 was good, and there was no evidence of velocity except a slight deep hum from the gear-train. At 83 m.p.h., the turbine makes over 12,000 revolutions per minute, and some music from the spinning teeth is only to be expected.

Tring, 32 miles from Euston, was passed at 8.25 p.m., and after this point there is an almost uninterrupted fall into London, but the distance was too short to allow the lost time to be made up. Willesden, with its maze of points and bright display of signal-lights showing up vividly in the darkness, was threaded at 8.45 p.m., and after several further checks No. 6202 came to a stand in the terminus at 8.55 p.m., 15 min. late. From Lichfield south the speed had been quite consistently high, the 116 miles having taken only (*Continued on page 374*)

"Old Glory"

The Flag of the United States

"*OLD GLORY*," the flag of the United States of America, is becoming more and more familiar in this country, and it is interesting to learn something of its meaning and history.

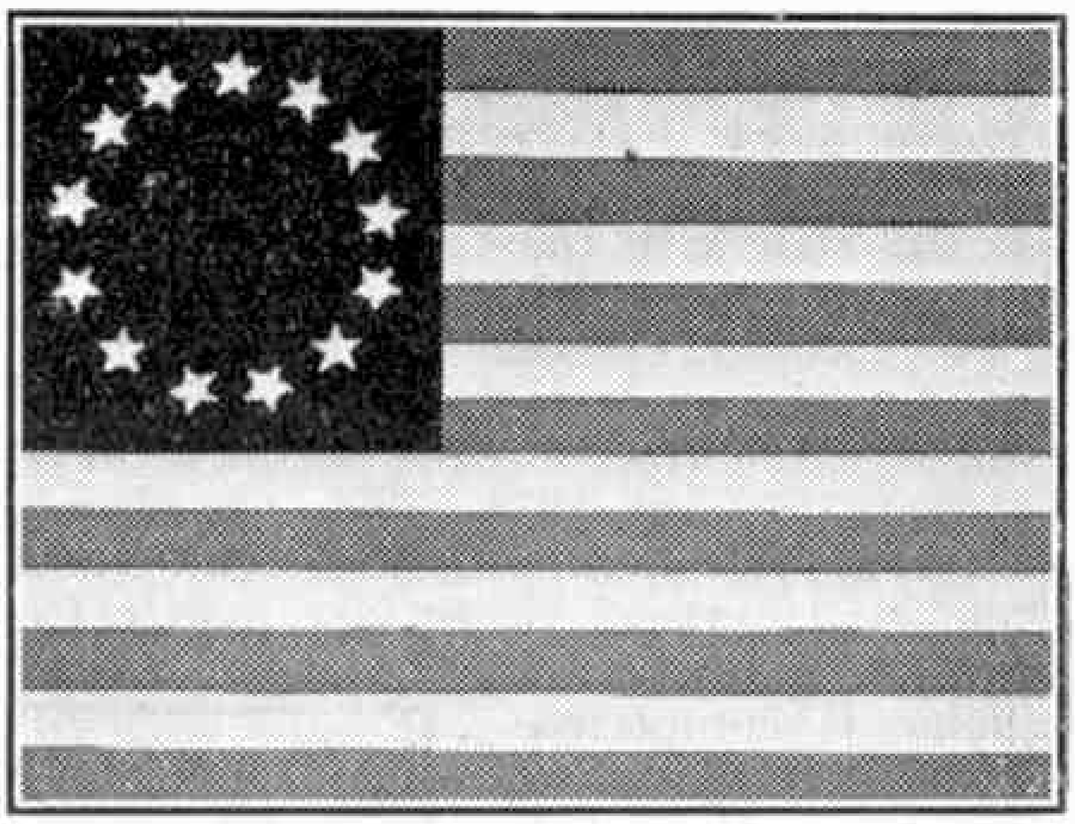
The adoption of the Stars and Stripes took place on 14th June, 1777. The resolution of Congress reads as follows: "Resolved, That the Flag of the United States be thirteen stripes, alternate red and white, that the union be thirteen stars, white in a blue field representing the new constellation." The thirteen stars and stripes represented the thirteen States at that time admitted to the Union. These, in order of admission, were Delaware, Pennsylvania, New Jersey, Georgia, Connecticut, Massachusetts, Maryland, South Carolina, New Hampshire, Virginia, New York, North Carolina and Rhode Island.

George Washington took the first design for the flag to Mrs. Betsy Ross of Philadelphia, who was reputed to be the cleverest needlewoman in the city. She suggested, among other things, that the stars should have five points instead of the six proposed. It was objected that five-pointed stars would be difficult to make; whereupon she folded a piece of paper in a particular way and with one cut of her scissors produced a star with five points. Her suggestions were incorporated in the design, and the first flag thus made was approved by Congress. This flag, as shown in the accompanying illustration, had the stars arranged in a ring; but soon afterwards this design was replaced by one with the stars in straight rows of four, five and four.

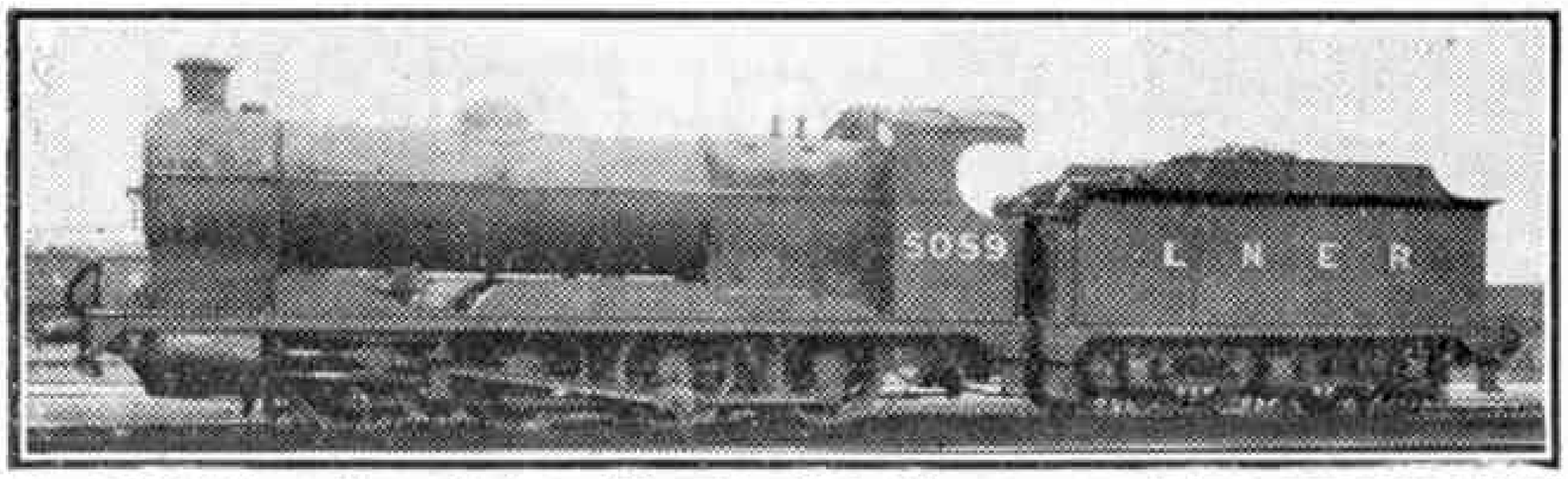
It was originally intended that a star and a stripe should be added for each new State brought in. This was practicable as regards the stars, but it was soon found that the continued addition of stripes was going to result in ruining the appearance of the flag. It was therefore decided to limit the stripes to the original number of thirteen. The flag now carries on the dark blue canton or union 48 white five-pointed stars, with one point up and two down, arranged in six rows of eight each, representing the 48 States of the Union. The canton is placed in the upper quarter of the flag next to the staff and it extends to the lower edge of the fourth red stripe from the top.

The 14th of June is now observed as National Flag Day throughout the United States.

Each of the 48 States has also its own flag and many of these are both interesting and beautiful. Some of them bear arrangements of stars to indicate the order of the State's entry into the Union. The red flag of Arkansas, for instance, with its white diamond, bears 25 white stars denoting that the State is the 25th of the Union; the Indiana flag, with a golden torch on a dark blue field, bears a ring of thirteen stars to indicate the thirteen original States, five stars for the five States that joined before Indiana, and a single star for Indiana, making a total of 19, which is the State's number in the Union. The flag of Washington is distinctive in being the only green flag among the States.



The first form of the Stars and Stripes.



An L.N.E.R. engine of class Q4, of which 25 are now being converted into tank locomotives of class Q1. The illustrations on this page are reproduced by courtesy of the L.N.E.R.

L.N.E.R. Engines Rebuilt as Tanks

TO produce as quickly as possible shunting engines urgently needed for wartime freight traffic, the L.N.E.R. are converting 25 of their older type eight-coupled freight tender locomotives into tank engines for heavy shunting duties. But for the war, these tender locomotives would probably by now have made their last journey—to the scrap yard.

By avoiding the construction of new shunting engines, 900 tons of steel will be saved, and as no new steel castings have been required, no demands have had to be made on steel foundry capacity. Furthermore, the tenders made available by the conversion will be allocated to new 2–8–0 coal traffic locomotives now under construction at Doncaster, with the result that it will be possible to place these engines more quickly into service. The work of conversion indeed is taking place side by side with the construction of the new 2–8–0 engines.

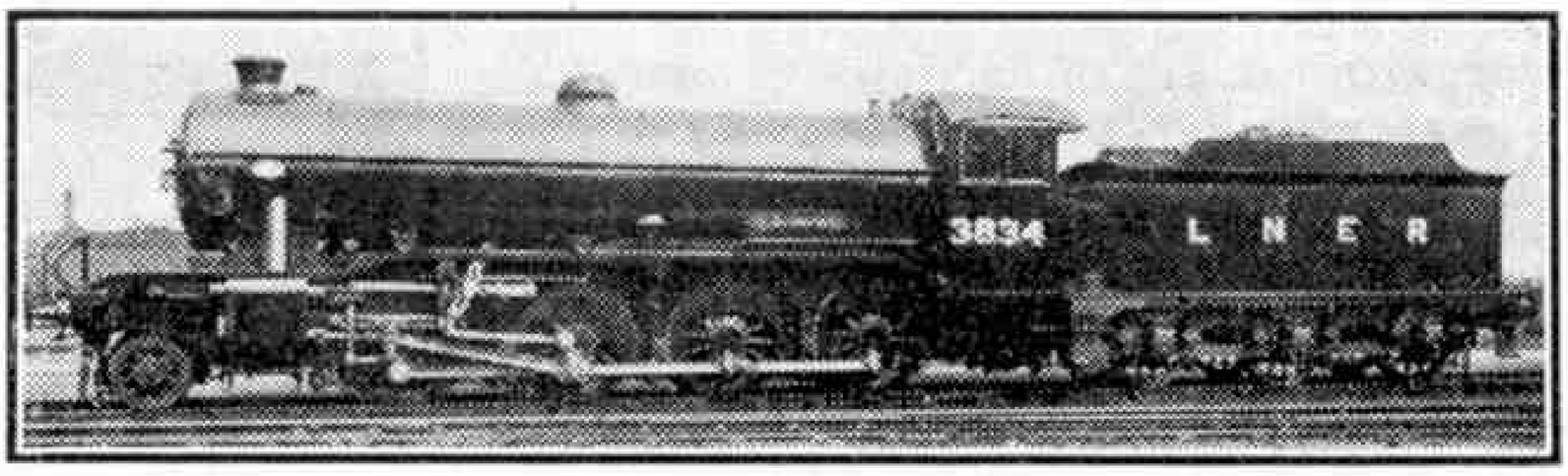
L.N.E.R. tank engine No. 5058, the first of the new Q1 class.

The locomotives that are being altered and given a fresh lease of life are 0–8–0s built by the former Great Central Railway between 1902 and 1911. They are classed as Q4 by the L.N.E.R., and only 16 of them will remain in service when the present conversion scheme is completed.

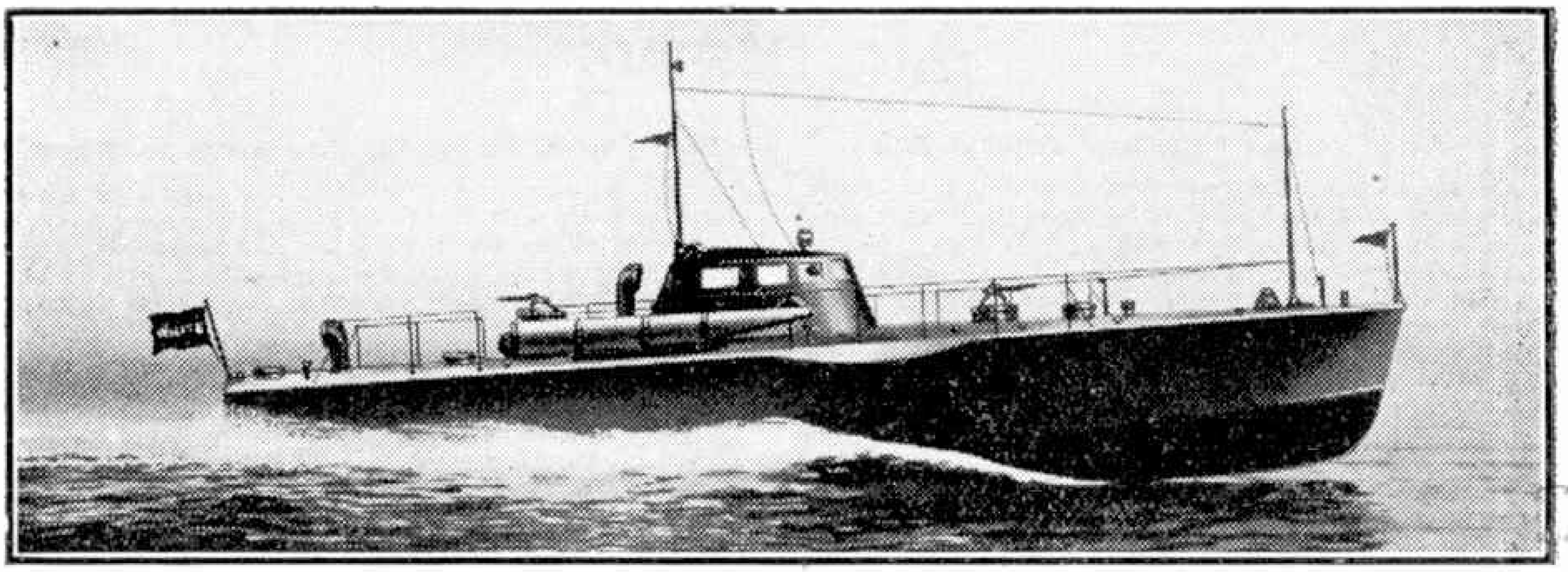
The new tank engines retain the 0–8–0 wheel arrangement. The side tanks will hold 1,500 galls. of water and the bunker 4½ tons of coal, and the total weight of each engine in working order is 69 tons 18 cwt. The framing at the back end has been built up to take the tank engine type of buffer and draw-gear arrangement, but apart from these alterations the whole of the old material has been worked in. The tractive effort is 25,644 lb., so that the locomotives are considerably more powerful than the standard L.N.E.R. six-coupled shunting engines, and they will therefore be used for the heaviest shunting duties. They take over the classification Q1, formerly given to the now extinct ex-G.N.R. K1 0–8–0 locomotives.

No. 5058, the first of the new tank engines, was placed in service in June of this year, and is illustrated on this page, together with an original class Q4 engine, No. 5059, and No. 3834, one of the new 2–8–0 engines to which the Q4 tenders are being transferred. No. 5058 is painted wartime black, and is the first L.N.E.R. steam engine to have the company's totem on the bunker sides in place of the large letter "L.N.E.R." that have hitherto been displayed. She and her sisters represent the first tank engine design of the 0–8–0 wheel design to be built by the L.N.E.R.

The conversion of these engines has been carried out at Doncaster to the designs of Mr. E. Thompson, Chief Mechanical Engineer of the L.N.E.R.



L.N.E.R. No. 3834 one of the new class 02 2-8-0s. These engines are taking over the tenders of the converted class Q4 engines.



"Whitecraft" Motor Torpedo Boat.

Navy's Pocket Power-Ships

By "Spithead"

ADVENTUROUS youth in naval warfare has scored an outstanding success with the motor torpedo boat. This is the modern equivalent in sea power of David versus Goliath. Since the outbreak of war these smallest units of the Royal Navy have attacked and sunk large tonnage craft of almost every type in the enemy's merchant marine. They have been of invaluable service also on coastal patrol, in submarine chasing, and convoying in home waters.

These little ships, with a striking power out of all comparison to their size, are really a new Naval arm, the first flotilla having been commissioned by the Admiralty in 1938. They were 60-footers, the forerunners of the far more powerful 70-footers now being mass-produced in this country, in Canada and in the United States. Four famous British firms were mainly responsible for developing the motor torpedo boat—Thornycroft, which produced the first torpedo boat, H.M.S. "*Lightning*," in 1877; Samuel White, a firm that has been established over 300 years and used to build old "wooden walls" for the Navy; Vosper, and the British Power Boat Company which supplied the Admiralty with the first flotilla of M.T.Bs.

In the early days critics thought the M.T.B. too small; they called it a "mechanical toy," incapable of standing up to stress of weather in blue water. This criticism was easily shattered when the Admiralty sent a flotilla of 60-ft. M.T.Bs. from Portsmouth to Malta, across a turbulent Bay of Biscay, and confounded all the critics with their excellent sea qualities.

Since the outbreak of war the actual fighting power of the M.T.B has been enhanced greatly with its increased speed and the development of apparatus giving a more deadly torpedo aim. Its amazing manœuvrability make it impossible of successful attack by enemy submarine, and its shallow draught saves it from being mined. Gunners in enemy craft find it an extremely hard target — an elusive camouflaged silhouette that is more like a dancing shadow than a ship. Another important feature of the M.T.Bs. is that they are relatively less subject to weather disabilities than other naval craft; while their bases are mobile, easily established and need little planned harbourage.

The immense speed of the M.T.B. is derived from high-powered engines, mostly Rolls-Royce, 1,100 b.h.p. marine units, giving a continuous high cruising speed of 42 knots with a full war load. The top speed is of course a strictly guarded secret.

Although the M.T.B. is essentially a torpedo-discharging craft, it has an important secondary armament consisting of automatic guns in power-worked turrets, depth charge and smoke screen apparatus, and anti-aircraft guns.

When the boat is under way at speed the noise of the main engines is thunderous, making conversation impossible. Even the Commander at the wheel uses hand signs, much in the manner of a motorist, to indicate his intentions, as his voice could never be heard. He and the coxswain stand on thick rubber mats that take the shock of the boat's slamming in the big seas, while the crew crouch at action stations.

Air News

"Flying Fortress" Bombers' Daylight Raid

Boeing "Flying Fortresses" of U.S. Army Air Force units now stationed in Britain have been used very effectively on daylight bombing raids upon enemy-occupied territory in Europe, and 13 such raids were carried out before any of the bombers were lost. During one daring raid of this kind, on 7th September last, upon the Schiedam shipyards at Rotterdam and the railway yards at Utrecht, the "Flying Fortresses" destroyed 12 and damaged many others of the large number of enemy fighters sent up to oppose them.

On the two previous days three squadrons of these heavy bombers carried out very successful daylight raids upon military objectives in France without loss and in spite of strong enemy fighter opposition. On the first occasion they attacked the great marshalling yards at Rouen, and on the second their target was an aircraft factory at Meaulte, near Albert. On all these raids the bombers were escorted by "Spitfires" which carried out diversionary sweeps while the "Flying Fortresses" concentrated upon their objectives.

A striking photograph of this heavy bomber in the air is reproduced on this page. It carries a medium bomb load, and is armed with 13 guns. There are three gun turrets, one each in the underside, top, and tail of the fuselage. The tail gun turret is remote controlled.

A.T.C. Cadet Navigates his Navigator

Cadet G. H. Earle, of No. 643 (Peter Symond's School) Flight, A.T.C., Winchester, recently "navigated" an operational type aeroplane from Hampshire to Brecon, South Wales, and back, during one of the flights given to A.T.C. cadets while in their summer training camps with the R.A.F. and the Royal Navy. The qualified navigator, a Lieut. Commander, R.N.V.R., in the machine had nothing to do beyond checking the cadet's calculations, and he was so favourably impressed by Earle's navigation that he reported it to the A.T.C. Commanding Officer.

"I set a course to take me to Brecon, South Wales, and over the whole of the outward journey he was able to give me the exact position at any time," related the navigator. "On the return journey I left the entire 'navigation' to him, and in spite of my efforts to 'fox' him by slowly getting off course, flying over cloud, etc., he brought me right over the aerodrome. After coming down through broken cloud he was temporarily lost, but quickly obtained a fix. Visibility was not good, and the whole performance was an excellent example of intelligent map reading."

Cadet C. H. Earle joined No. 643 Flight, A.T.C. in February of this year. He is not yet 17 years of age, and has had a total of about 60 hrs. instruction in the Corps. He has had two previous flights totalling about 2½ hrs. flying experience.

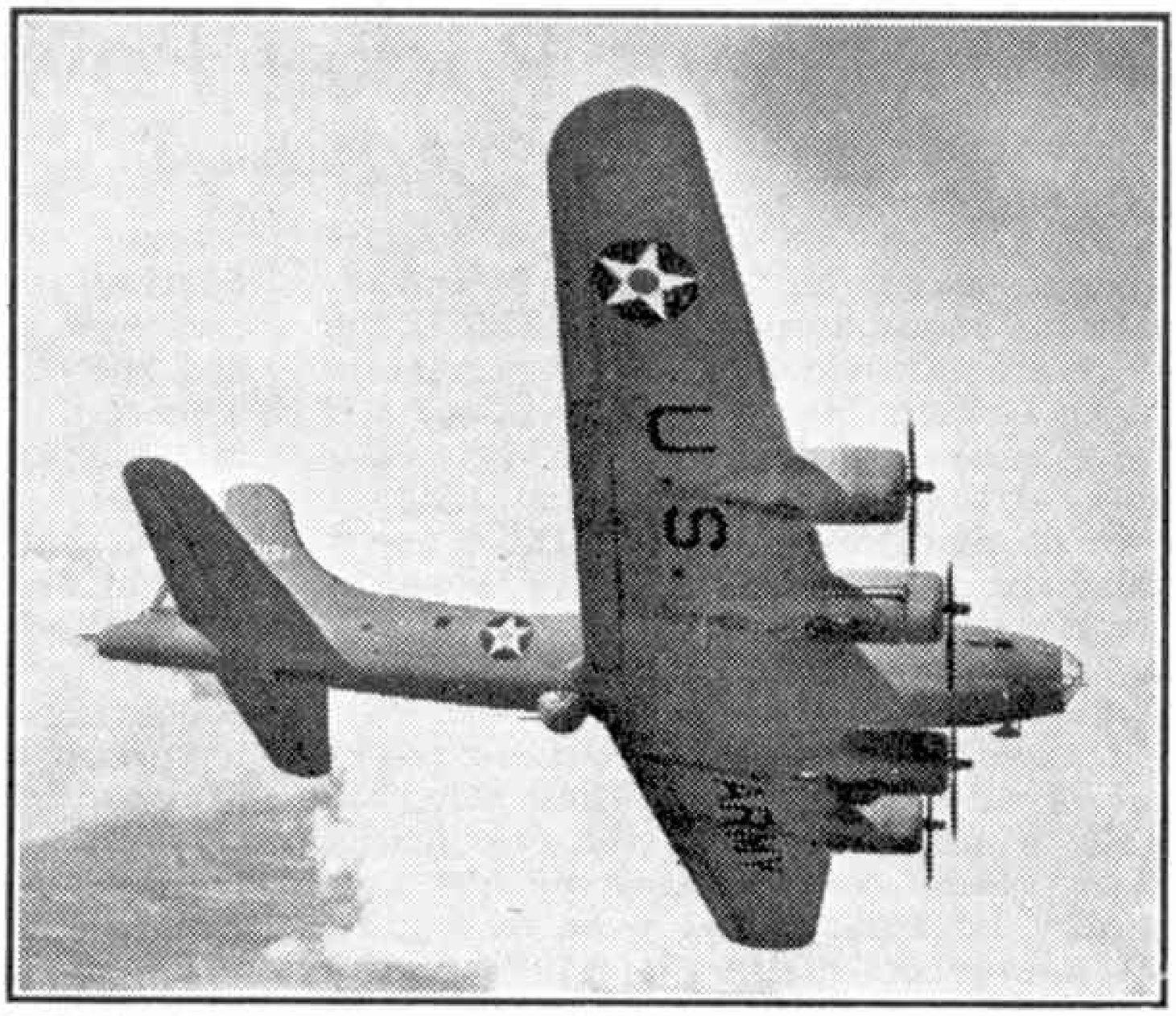
* * * *

It is reported from the United States that Mr. Howard Hughes, the well-known airman and film producer, will work with Mr. Henry Kaiser in designing the big freight-carrying aircraft which are to be built in Mr. Kaiser's shipyards.

Boeing Build Gliders for U.S. Army Air Forces

Large motorless troop transports for the U.S. Army Air Forces are now in production at the Boeing aircraft factories. When the U.S. Army Air Corps began the glider programme there was difficulty in getting the motorless craft, which are made largely of plywood or light metal, because they had to be constructed individually. Now that the Army Air Forces production schedule is well under way large numbers of gliders will be produced through a co-operative plan in which Boeing are taking part with other aircraft makers.

The Boeing Company's Kansas plants were easily adaptable to glider construction, as they had recently completed the new AT-15 Crew Trainer (illustrated in the August 1942 "*M.M.*"), which is mainly built of steel tubing and wood, so as to conserve precious metals.

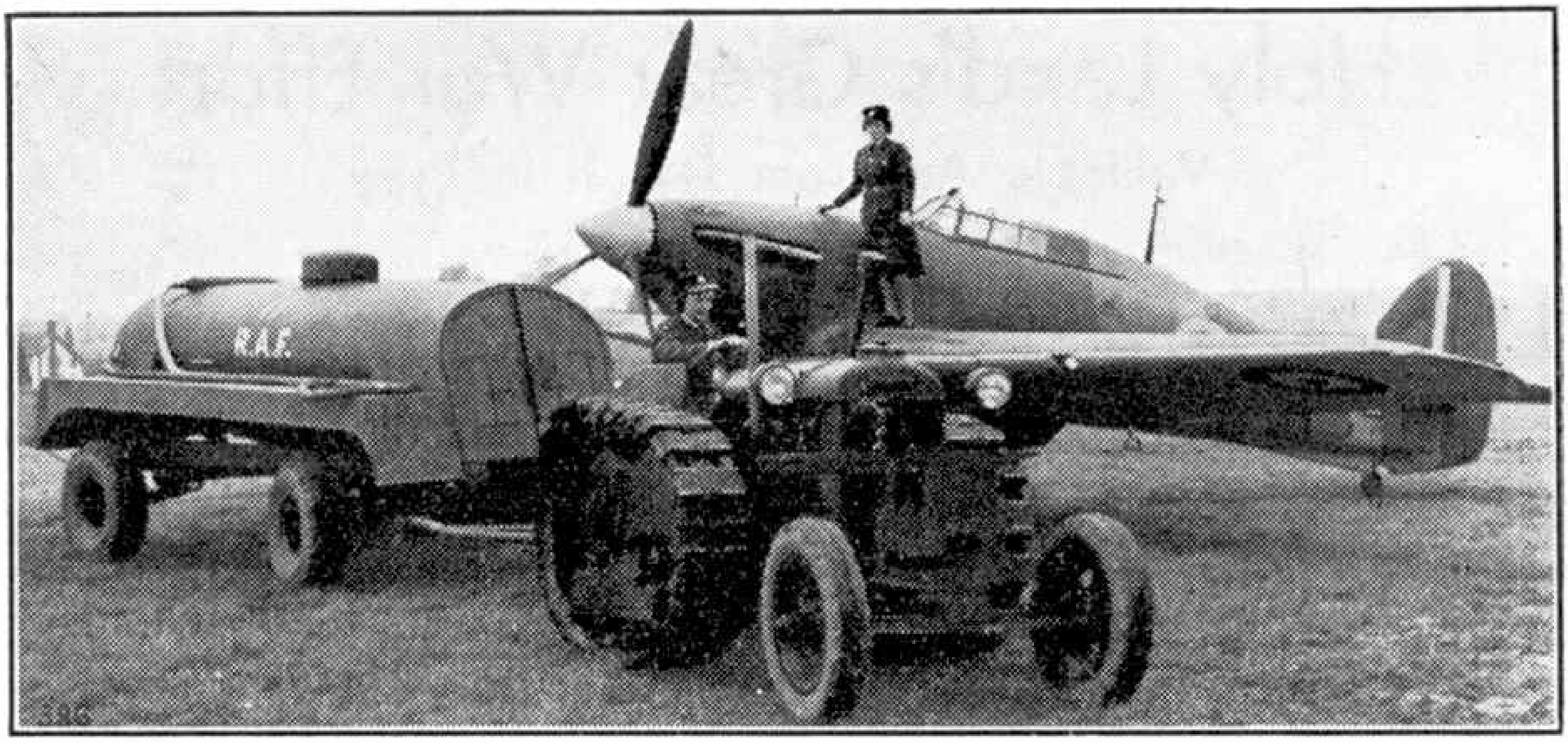


A Boeing B-17E "Flying Fortress" heavy bomber banks to the left and displays its four powerful engines. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

Production also of great numbers of the Primary trainers made the company's woodshop rank among the largest. These two types of Boeing trainer aircraft are still being produced in quantity, but part of the manufacturing facilities have been turned over to the new glider programme. Details of this vast glider production schedule cannot be revealed, but it is reliably reported that the U.S. Army Air Force gliders will be better than those used by Germany in the Crete campaign. The German gliders could carry about two tons of supplies or 12 to 15 infantrymen.

The New Air Training Plan

The British Commonwealth Air Training Plan agreement came into force on 1st July last, in succession to the original scheme introduced in 1939 which has been such a remarkable success. Under the earlier scheme Canada provided 80 per cent. of the trainees, and the United Kingdom, Australia, and New Zealand supplied the other 20 per cent., but under the new agreement the United Kingdom will provide 40 per cent. of the recruits for training, and Canada, Australia, and New Zealand will supply the remainder.



The W.A.A.F. refuel aircraft with the aid of a tractor.

Eire Internal Air Service Developments

Aer Lingus Teoranta, the Eire air line company, have begun a thrice weekly air service between Dublin and Limerick, using D.H. "Dragon Rapide" and D.H.86b machines. The termini are the Dublin municipal airport at Collinstown, described by the Eireann Minister for Industry and Commerce as "one of the finest in existence," and the Shannon airport at Rynanna, near Limerick. Passengers are conveyed by motor coach between the airports and the terminal cities. The fares are £3 single and £5/10/- for a monthly return. Limerick is about 20 miles from Foynes, and the new internal air service provides better connection with transatlantic air services to and from Foynes than is available by the present greatly restricted rail transport. It also provides a valuable link between the transatlantic services and the Dublin-Manchester air service.

Eventually the new air service may be extended from Limerick to Cork, but at present there is no suitable aerodrome in the vicinity of Cork. This serious lack was under consideration just before the war began, and it was then estimated that the needed aerodrome would cost about £100,000. The opening of the Dublin-Limerick service has revived the matter. Cobh (Queenstown) and Waterford are other places reported to be planning to have airports, and Drogheda is said to be planning the construction of a flying boat base on the River Boyne estuary. The Corporation of Galway are urging the establishing of an air service linking that town with Dublin.

"Lancaster" Bomber Demonstrated in Canada

In Canada great interest has been shown in an Avro "Lancaster" heavy bomber recently demonstrated there after having been flown direct from Great Britain. Quantity production of the latest version of this fine machine is about to begin in Canada. The "Lancaster" sent to that country was specially equipped, and had a crew of five, with Capt. Clyde Pangborn, the well-known airman, as chief pilot. Flying Officer I. L. Colquhoun, R.C.A.F., who is a member of a "Lancaster" operational squadron, and Squadron Leader R. Felgate, R.A.F., representing the Ministry of Aircraft Production, were passengers on the transatlantic flight.

* * * *

Flight testing of the first Consolidated "Catalina" flying boat produced in Canada has begun.

* * * *

Work will begin this year on the construction of a new airport at Basle, Switzerland, which will cost about £225,000. It will have an area of about 200 acres.

Fitter Fights Flames to Save Burning Aircraft

Prompt and courageous action by members of the ground staff saved valuable parts of a "Halifax" bomber which had caught fire. One of the port engines burst into flame in the air during a training flight, but the pilot made a safe landing at the aerodrome and the crew scrambled out. In a few moments a fire tender was on the spot, and foam was sprayed over the blazing engine, but the flames spread over the port wing and set fire to the fuselage. Flares inside the machine were touched off, and then ammunition began to explode.

The Wing Commander and men from the ground and maintenance crews rushed from all parts of the aerodrome to help. Petrol tanks in the port wing were now blazing furiously, and so was the cockpit and the front half of the fuselage. But the Wing Commander saw that there was a chance of saving the two starboard engines and the tail plane, and he organised the party for this purpose.

A tractor was connected to the starboard wing, and while men hacked at the main spar among the flames the tractor tugged until suddenly the wing was torn away. This severed the petrol pipe, and a trail of fuel immediately caught fire and transformed the end of the pipe into a jet of flame. With fire spurting from the broken pipe there was danger that the starboard wing, with its hundreds of gallons of petrol, would soon be alight.

Heedless of the exploding bullets and of the intense heat, a fitter tried to stuff his forage cap into the open end of the pipe, but his cap was quickly burnt to powder. He got into a lorry and dashed to the blacksmith's forge, returning with a pair of tongs on to which he had jammed tubes to lengthen the handles. With these he tried to close the end of the flaming pipe. Again he was unsuccessful, but in spite of burns on his face and hands he tried another method. This time he threw the trousers of an asbestos suit over the end of the pipe, and then tried to bind rags round the opening. Once again his effort failed, but he refused to give in, and scooping up clay from the edge of the runway, he stuffed it into the end of the pipe. This effectively choked the flames.

"It was due to him that we saved the wing and the two valuable Rolls-Royce engines," said the Wing Commander. "That fitter put up a magnificent show."

* * * *

The number of Royal Canadian Air Force squadrons in Great Britain is to be increased by 50 per cent. The additions will include fighter, bomber and Coastal Command squadrons.

Holy Land's Great War Effort

Valuable Aid from Jewish Industry

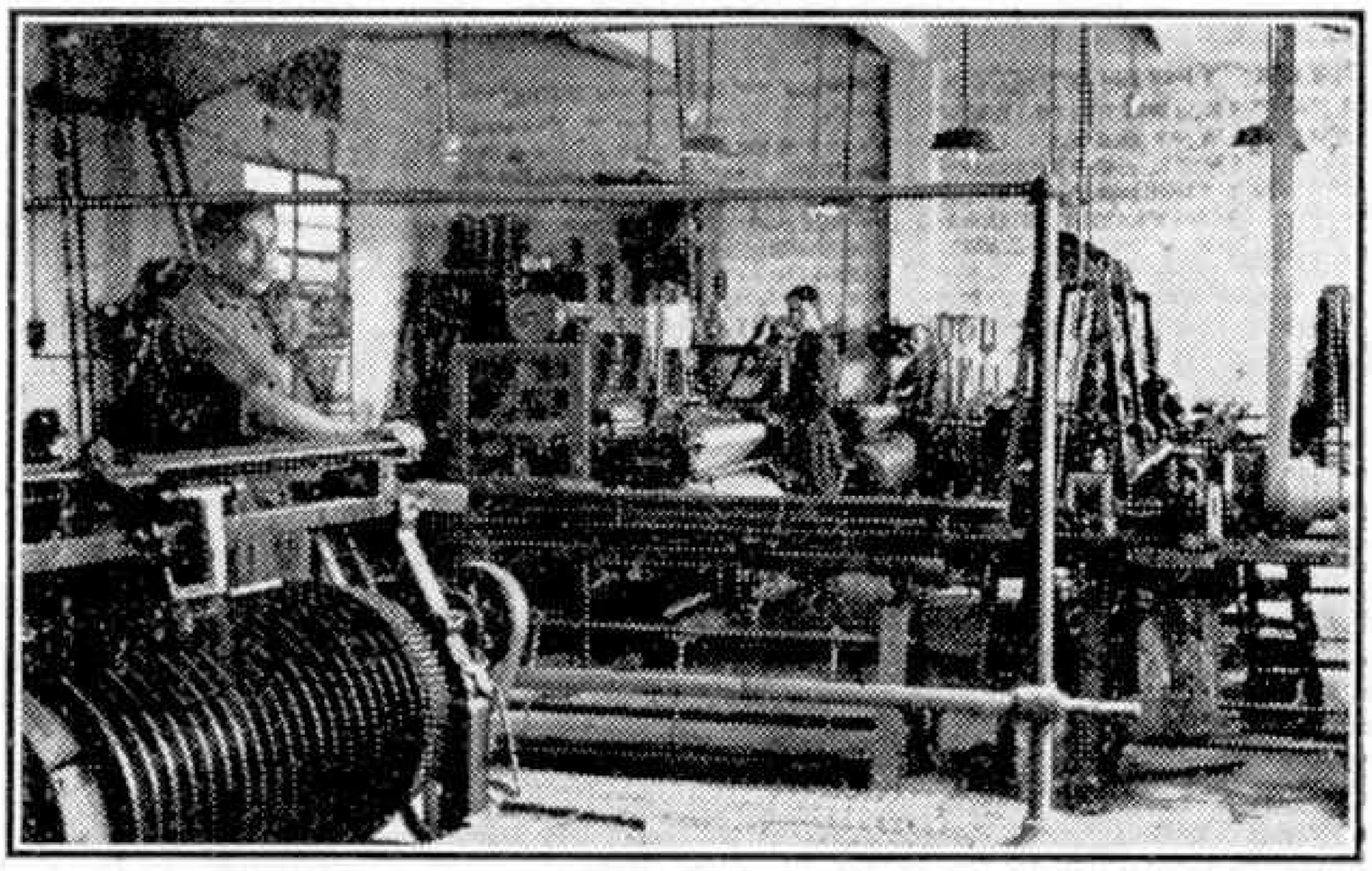
By Harold J. Shepstone, F.R.G.S.

LITTLE has been said of the valuable aid that the Jews of Palestine have been rendering our forces in the Middle East by supplying them with a host of necessary articles and commodities for carrying on the war. The fact is, few outside Palestine are aware of the extent to which the country has been industrialised. It was Hitler who was responsible for converting this little land of sacred memories into a busy industrial nation.

The wholesale persecution of the Jews in Germany and Eastern Europe meant that Jewish manufacturers and traders, experts in many branches of industry, were driven from their factories and workshops. They sought refuge in Palestine, and when they had settled down in the new land began to establish similar enterprises. Many of them brought their plant and machinery with them. During the five years preceding the war over 50,000 Jews from Germany alone migrated to Palestine. To this number one has to add many thousands more from Austria, Czechoslovakia, Poland and Roumania. The total number of Jews in Palestine to-day is just under half a million.

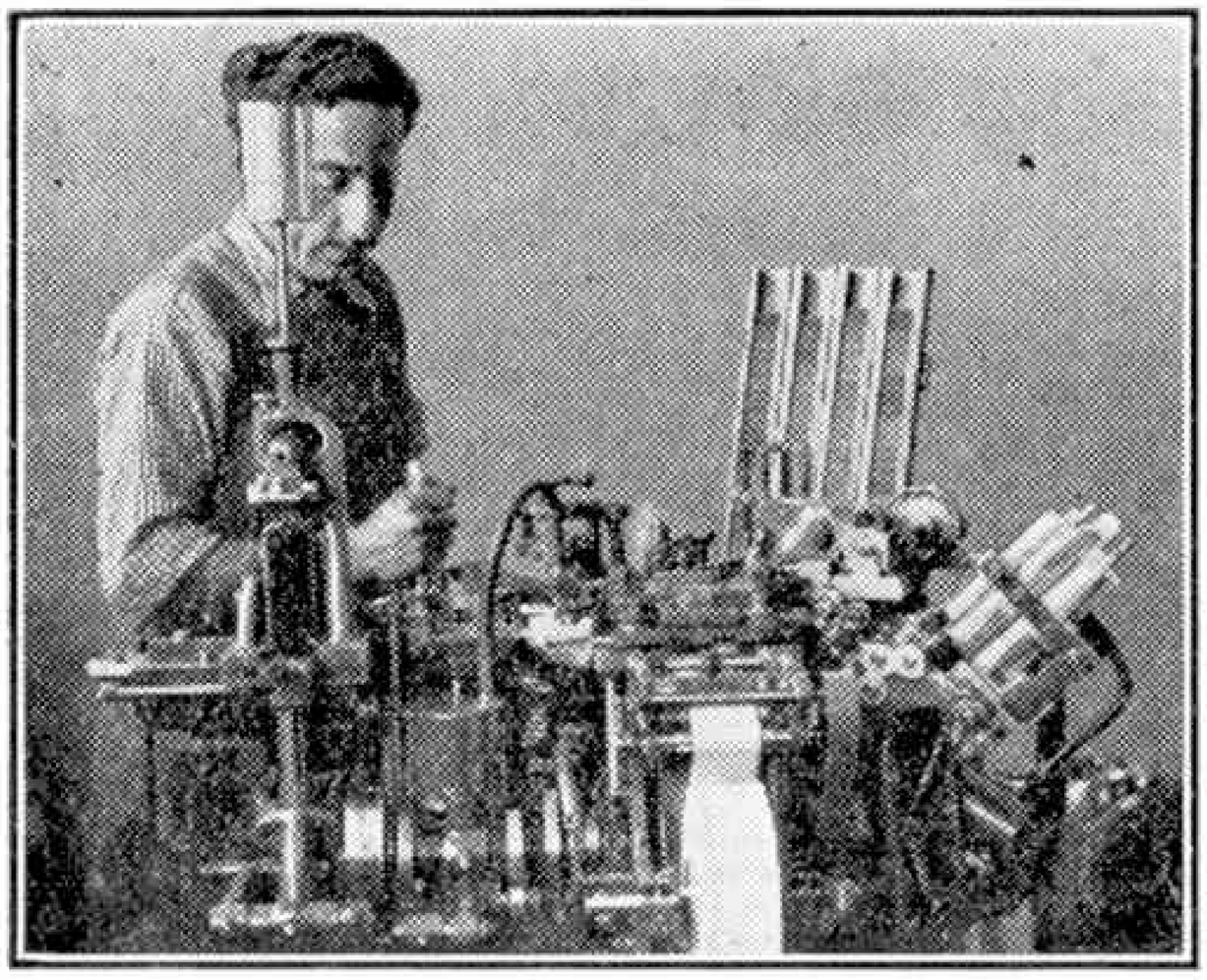
When war broke out there was some 5,666 Jewish industrial concerns in Palestine made up of 540 large factories, 1,076 workshops and 4,050 artisans' establishments, producing between them a host of varied articles. These enterprises gave employment to some 35,000 workers and the annual value of the goods they turned out was over £15,000,000. To-day Jewish industry in Palestine gives employment to over 50,000 workers. Within the past year 400 new factories have been established, virtually all of them engaged on war work. These factories are to be found scattered all over the country. They are in every sense of the term modern buildings, with the very latest machinery and equipment.

Clothing and textile are well represented, employing between them over 5,000 hands. Both cotton and artificial silks are being produced on modern looms. Three large spinning mills are at the moment working full speed turning out cotton drill for military uniforms; another factory, leading in production of underwear, stockings and socks, is busy on Army orders. There are half a dozen important concerns turning out 130,000 pairs of boots and shoes a month, much of these being supplied to the armed forces. One firm is making motor car bodies and duplicating motor car parts. There are 250 establishments devoted to the metal industry, and these, with their highly skilled labour, have been found invaluable in assisting in the rapid repair of damaged equipment and other similar jobs. A barbed wire factory has enlarged its premises five times, but is unable to keep pace with its orders. A factory that formerly produced bath-tubs is now producing steel helmets for the forces. It is an example of how the factories have been adapted to Army needs.



Making barbed wire in a factory.

One of the problems of Palestine has been what to do with its surplus oranges and grapefruit. They could not be exported as there were no ships to take them. Some have been turned into jam and sugar, some to cattle food, some to alcohol for war purposes, and some to citric acid.



Automatic machine for packing safety razor blades in a Safety Blade Factory.

In a single year some 15,000 tons of citrus fruit was treated in this way. The pharmaceutical industry has grown tremendously since war broke out. A new chemical factory has been in operation for the past few months, manufacturing acids, including citric acid, which is essential for the pharmaceutical industry and for metal working, and pure acid for accumulators. The factory produces also sulphuric acid purified by a special process. Oil works are producing a high-grade olive oil and olive oil soap.

A cement works had an annual output of some 300,000 tons of cement before the war. To-day it is producing more than double that quantity, and this is being used largely for building pill-boxes and defence works. A somewhat unusual industry to find in Palestine is that of diamond cutting and polishing. There are 30 factories devoted to this work. The foundation of the industry was laid by Jewish immigrants from Antwerp, formerly world centre of the industry. The factories now employ 2,000 workers, and it is expected that during the next six months they will absorb an additional 1,000. A Jerusalem Jew has invented a new device which it is claimed will greatly improve the accuracy of cutting and polishing and enable the workers to do their work in half the time. The factories handle about £500,000 worth of uncut stones annually, and many of these, after being cut and polished, are used in all kinds of tools.

These industries have been made possible by the supply of cheap electrical power from hydro-electric plant operated by the waters of the River Jordan. In 1935 it supplied 25,100,000 kilowatts to the various factories; to-day the figure is over 45,000,000 kilowatts. The Dead Sea is being brought to life and its valuable mineral deposits exploited for the war effort. Not only is the Dead Sea the principal source of potash for the British Empire, but also it yields bromine, chlorine, caustic soda, magnesium salts and many other chemical products valuable in war.

Perhaps the Holy Land's most curious industry is that of making artificial teeth. Before the present upheaval the American Porcelain Teeth Co. of Tel-Aviv was exporting over £30,000 worth of artificial teeth a year to all parts of Europe. Just now the factory is busy supplying the wants of the Army dentists. Many a soldier will return home from the Western Desert possessing teeth made in Palestine. As a matter of fact there are in this country at the present time some thousands of people who talk and eat with teeth that came from the Holy Land.

We have found these industries, entirely due to Jewish initiative, invaluable. To date they have executed war orders to the value of over £5,000,000, and they have been the means of saving not only much shipping space of very considerable value, but also time, which is another important factor in the war.

Machine room in an Elastic and Ribbon Factory.

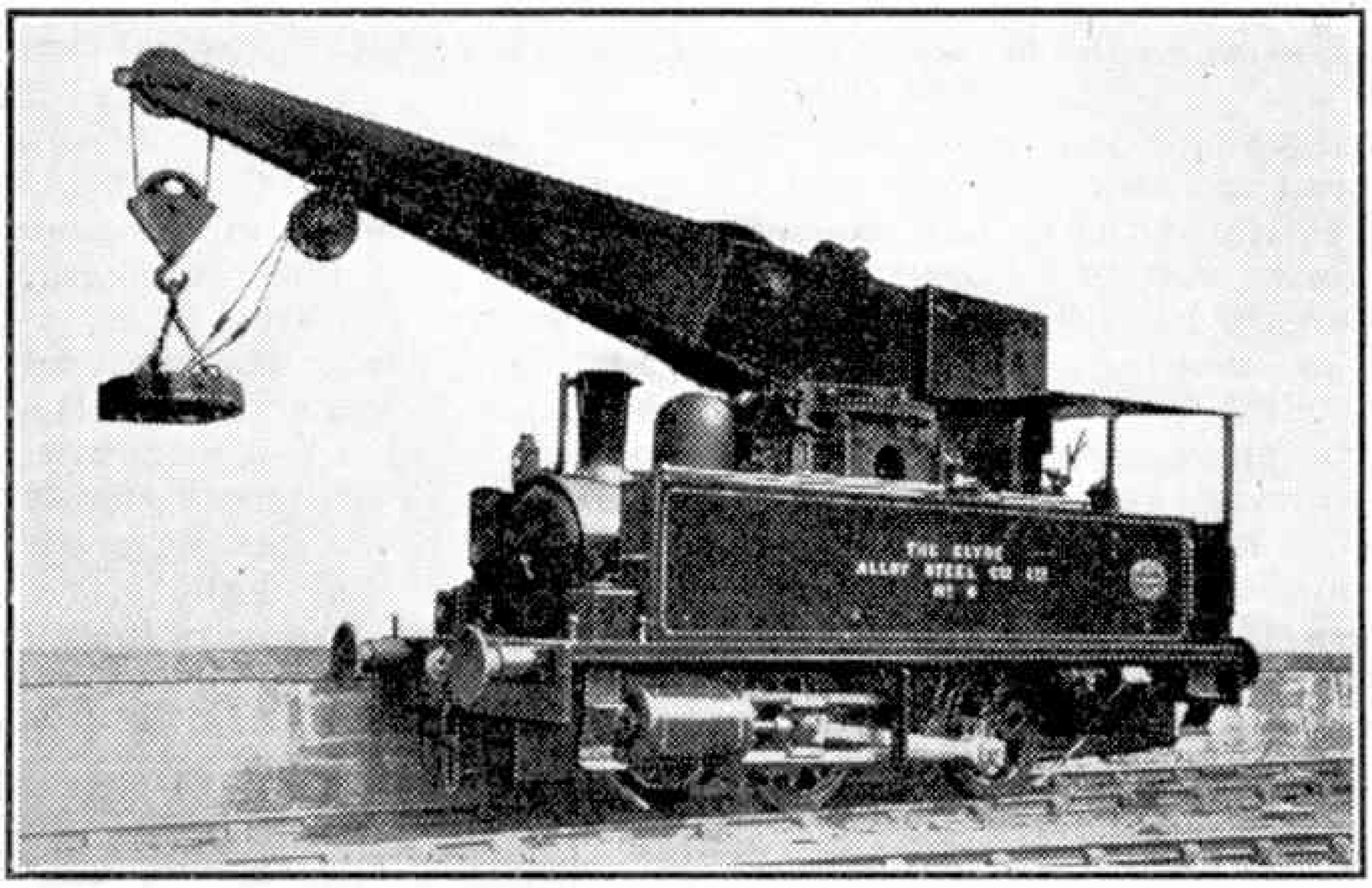
Engineering News

An Electro-Magnetic Crane Locomotive

A new type of crane locomotive has been introduced by Andrew Barclay, Sons and Co. Ltd., Kilmarnock. A crane locomotive consists of a shunting locomotive on which a crane has been fitted so that it can do lifting work and carry its load in addition to performing ordinary shunting duties. The new type, which is illustrated on this page, is provided with self-contained electro-magnetic lifting equipment, which greatly increases its usefulness in dealing with scrap iron and steel, ingots, ingot moulds, etc., as with it the need for slinging, bundling and filling of skips is avoided, thus saving both time and trouble.

The crane of a locomotive of this type is usually mounted on a pedestal or stool fitted to the frame at the middle of the wheelbase, and saddled over the barrel of the boiler, but clear of it. In older designs the slewing and hoisting engines were mounted on the boiler barrel, but in the latest Barclay designs they are carried by the crane stool. The locomotives are designed to be able to travel when carrying their greatest possible load, and this can be swung right round.

The problem of supplying current to the electro-magnet at the end of the revolving jib has been solved by making the vertical shaft of the hoisting gear hollow and passing through it a tube to carry the cable. This tube moves with the jib. At its lower end is a disc of insulating material carrying slip rings connected to the cables leading current to the magnet, and the rings are supplied with current by means of brushes connected to the generating set. This is mounted on one of the side tanks of the locomotive and is driven by steam from the boiler.



A crane locomotive of a new type, which is provided with electro-magnetic lifting equipment. It was constructed by Andrew Barclay, Sons and Co. Ltd., Kilmarnock, to whom we are indebted for our illustration.

The locomotive is of the Barclay standard 5 ton type, but its lifting capacity at the standard radius of 16 ft. is 4 tons 2 cwt., since the lifting magnet and its accessories weigh 18 cwt. The lift can be increased to 5 tons, but the jib must then be shortened to 13 ft. 6 in. The locomotive itself has a tractive effort of 14,200 lb., and its weight in working order is 42 tons 14 cwt. If desired the magnet can be removed by simply unhooking it from the hoisting cable, and the crane can then be used for its full lift of 5 tons at 16 ft. radius.

A Giant Paddle Steamer

The largest paddle steamer in the world is the "*Seeanbee*," which belongs to The Cleveland and Buffalo Transit Company, and for the past 29 years has been in service as a passenger vessel on Lake Erie, between Cleveland and Buffalo. The vessel is 484 ft. long, has four funnels and a high superstructure that makes it imposing. It formerly provided a comfortable overnight service between the two cities, and its size is indicated by the fact that on excursions it has carried 2,300 passengers. This remarkable paddle steamer is now serving the Allied cause, for it has been converted into an aircraft carrier and is in use, still on Lake Erie, for training pilots.

Capetown's New Dry Dock

It has now been decided that Capetown's new graving dock is to be 1,200 ft. long, 150 ft. wide and 45 ft. deep. It will be the largest in the Southern hemisphere and there are now only two in the world that are larger. Both of these are in the French Naval Dockyard at Toulon, and one is handicapped by being too narrow for its length, for it is only 118 ft. wide, although it is 1,318 ft. long.

The preliminary work on the site of the new graving dock is being pushed forward rapidly, and the greater part of the dyke marking out the area already shows above water.

Shasta Dam

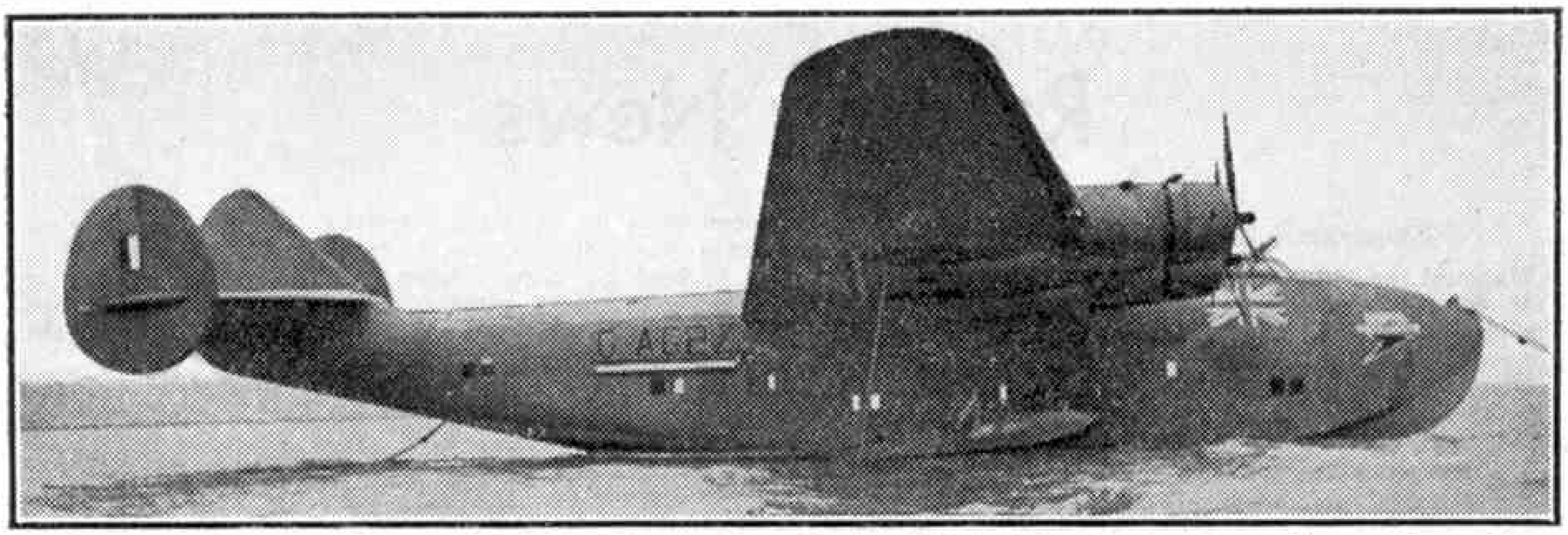
Shasta Dam in California, the second largest concrete dam in the world, reached the half-way mark earlier in the present year, when 3,000,000 of the 6,000,000 cu. yds. of concrete it will contain had been placed. Behind this immense structure a great lake will be formed, the waters of which will be released under control to prevent floods and to provide water for irrigation, and to generate electrical energy.

An interesting feature of the erection of Shasta Dam is that an important railway has had to be given a new position. The new railway track has now been in use for some time for traffic in one direction. The construction of the new line involved driving 12 tunnels and building eight large bridges. The most important of the latter is carried on concrete piers that at present are the highest in the world for a bridge of this type. They tower to a height of 500 ft. above Pit River, and at times clouds are to be seen below the deck of the bridge. The river will eventually be merged in the reservoir and when this is filled the tops of the piers will be only 35 ft. above its surface.

The Pit River bridge has two decks, an upper one with a road carrying four lines of traffic, and a lower one with two railway tracks. It is a cantilever structure with a total length of 3,588 ft.

* * * *

In three years of war our life-boats have rescued 4,775 lives, or more than 30 a week. The average for the previous 20 years of peace was seven a week.



This view of "Bristol," one of British Airways three Boeing 314-A flying boats, shows the massive hull.

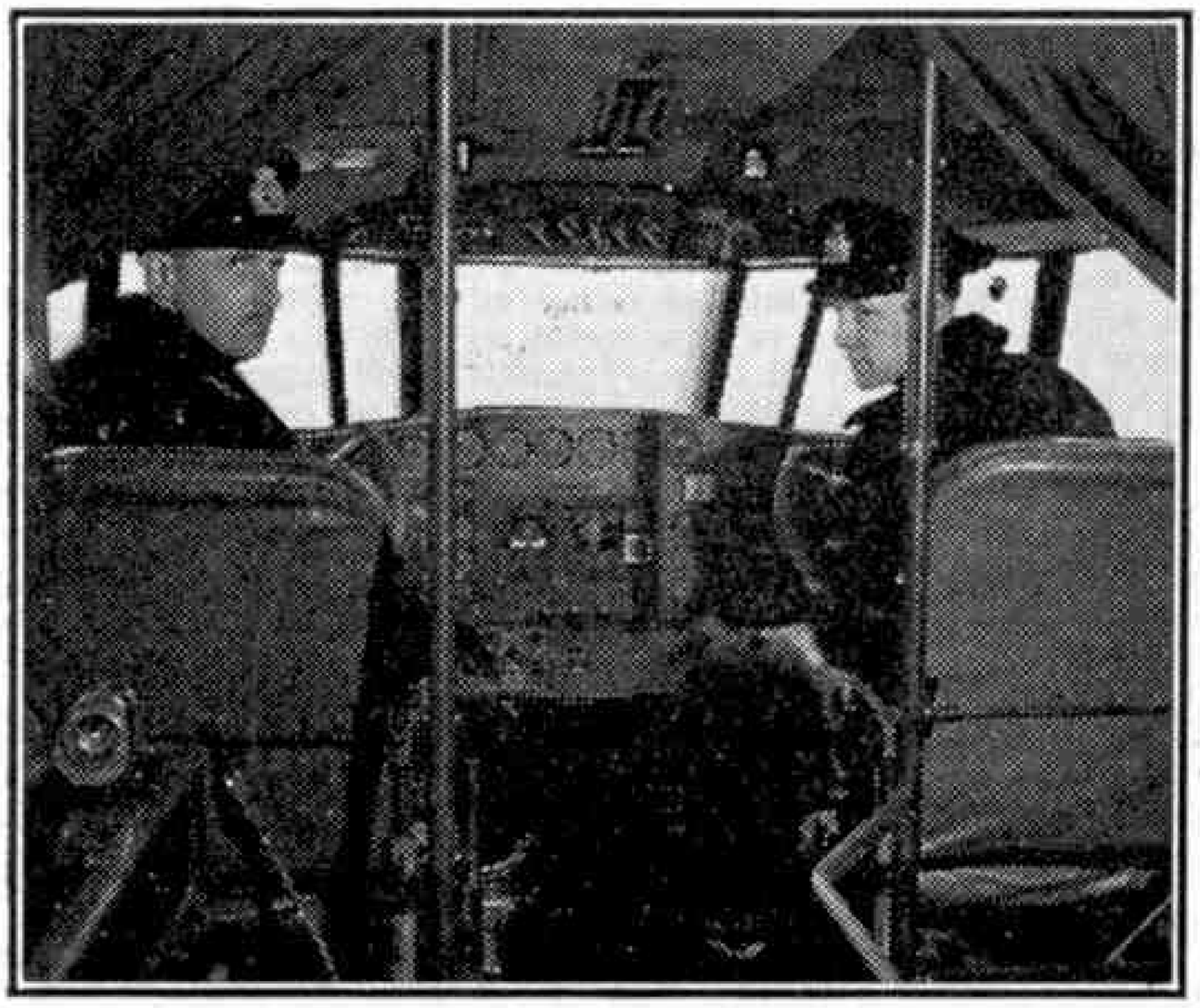
Boeing 314-A Flying Boats

The British Airways Trio

THE three Boeing 314-A flying boats "*Bristol*," "*Berwick*," and "*Bangor*," purchased last year from Pan American Airways by the British Government, have been doing good work on the wartime trans-atlantic service operated by British Airways. Only Government officials and diplomatic mail are carried by the boats.

"*Berwick*" has twice figured in the news. The first time was when it flew non-stop from Belem to Puerto Rico, a distance of about 3,000 miles, in a little over 24 hrs. The second and more recent occasion was when it brought the Prime Minister, Lord Beaverbrook, and British Service chiefs back from the United States on 16–17th January this year. On this great flight "*Berwick*" was commanded by Capt. J. C. Kelly Rogers, took off from Baltimore, U.S.A., and flew non-stop to Mount Batten, Plymouth, covering the 3,300 miles in 17 hrs. 55 min., at an average speed of 186 m.p.h. At times a speed of almost 240 m.p.h. was attained. During part of the Baltimore-Bermuda lap of the flight Mr. Churchill took over the controls, with the aircraft flying at about 8,000 ft.

These three flying boats are of the same size and design as the 314 type "Clippers" used by Pan American Airways, but have slight modifications. Their wing span is 152 ft., and they are 106 ft. long and 27 ft. 6 in. high. They carry a crew of 11, and up to 44 passengers by day the number varying according to the weight of fuel on board, which in turn depends upon the length of non-stop run to be flown. On night flights there are bunks and seats for 24 passengers. The crew's quarters, passenger cabins, toilet compartments, dining saloon, galley, and a mail and baggage compartment, are on the lower deck. The upper or flight deck is reached by a winding staircase just forward of the main saloon, and at its head is the control room, the front part of which is the pilots' cockpit, with twin seats. The Captain sits in the left-hand seat. In the centre of the array of instruments mounted in front of the pilots' positions are the Sperry blind-flying panel and automatic pilot.



In the pilots' cockpit of the Boeing 314-A.

Behind these two men are three other members of the crew. The Navigating Officer sits at a big chart table that occupies the whole of the port side of the flight deck. Across from him, on the starboard side, is the Flight Engineer, who gives the Captain the "take-off" signal and during the flight is responsible for the control, operation, and adjustment of the four 1,650 h.p. Wright "Cyclone" engines. He makes a routine inspection of the engines at regular intervals while the flying boat is in flight, and reaches them through bulkhead doors on either side of the flight deck. These doors give access to companionways that lead through tunnels in the wings to the engine nacelles. Next and with his back to the Flight Engineer is the Radio Officer, whose equipment includes a radio compass, and two receivers and two transmitters at the back of the flight deck and operated by remote control.

The range of the Boeing 314-A is more than 4,000 miles, and most of the huge quantity of petrol required is carried in built-in tanks in the sponsons, or stub wings. These sponsons are mid-way along the hull, and in addition to giving the flying boat stability when it is on the water they serve as useful landing stages.

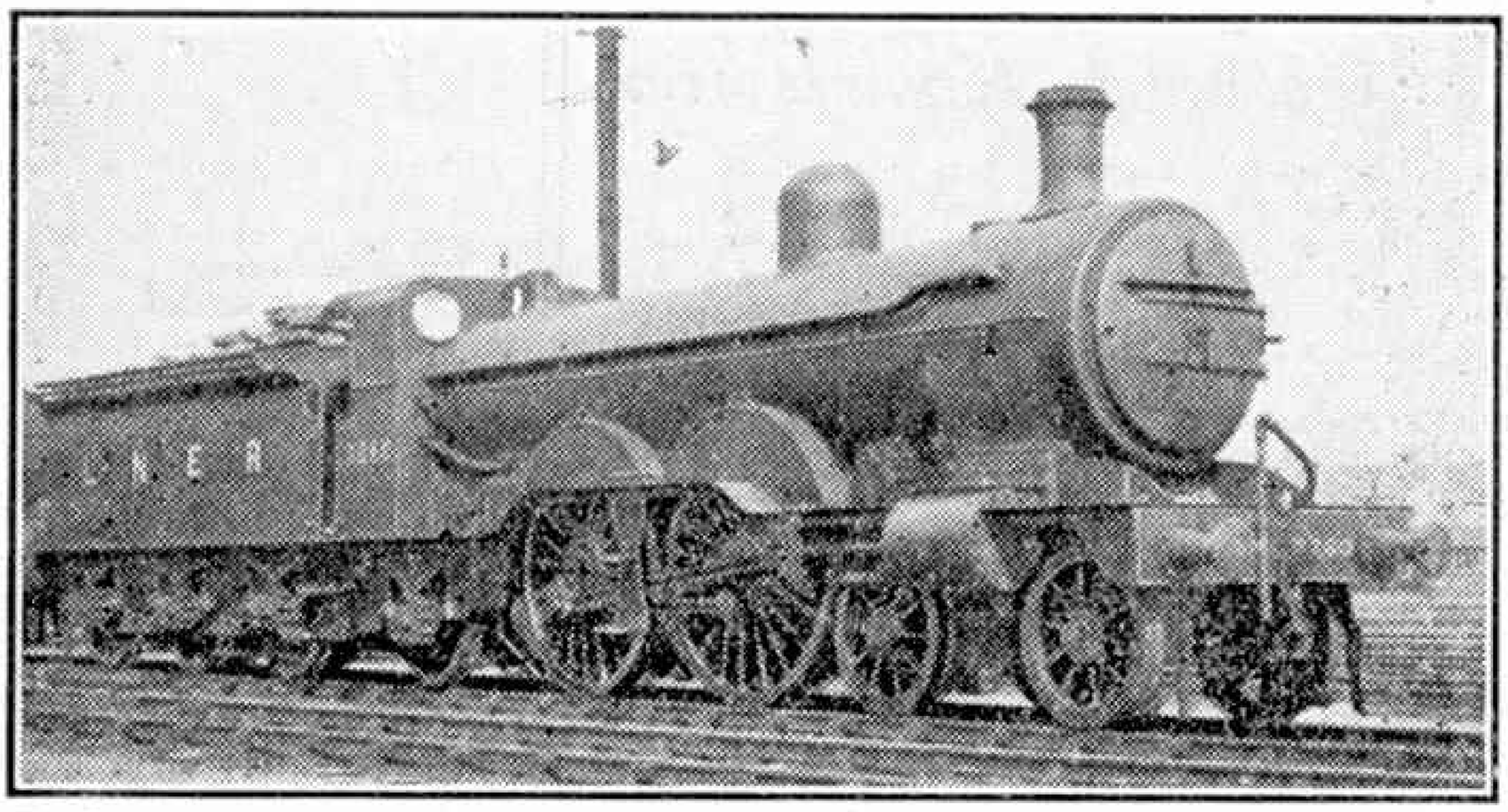
Railway News

"Klondykes" Helping the War Effort

Many of the older types of passenger engine are still able to render valuable service in connection with the handling of the enormous freight traffic at present passing over British railways.

The sight of L.N.E.R. 4–4–2 No. 3259 on a wet day, throwing out clouds of smoke and slipping, but slowly and surely hauling 45 wagons of coal up the 1 in 198 to Stoke summit on the main line, after being stopped on the goods road for an express to pass, reminded us that there are only five of these former G.N.R. "small Atlantics" left. They are 40 or more years old and are now normally employed on secondary routes in the Midlands with light passenger trains.

They were the forerunners of the much larger boilered and more famous "large Atlantic" class built for the G.N.R., and were nicknamed "Klondykes" in their early days, after a catchword that became prominent after the famous gold rush to the Klondyke valley in the Yukon.



Ex-G.N.R. small-boilered "Atlantic" No. 3260, as it appeared after amalgamation. This locomotive has now been scrapped.

Interchange of Locomotive Power in Devonshire

G.W.R. 2–6–0 locomotives of the 63xx or 73xx type are interchanging duties on the steeply-graded Exeter-Plymouth routes with the S.R. "N" class 2–6–0s. One company's engine works the other's train and in the case of certain workings the outward journey is made over one company's line and the return by the other. The familiarity with both routes that is being gained by the locomotive crews would be of great value in emergency, when one might be temporarily blocked. Arrangements also have been made, as in other parts of the country, for G.W.R. services to the West of England to travel over the Southern route from Basingstoke through Salisbury and Exeter in case of need, and in this connection a table of maximum loading has been drawn up for G.W. "Star," "Saint," "Hall" and 2–6–0 engines when running on the Southern.

L.M.S. Notes

The 51 class "3P" 4–4–2 tank engines based on the former London, Tilbury and Southend (Midland) design are now all back on the Tilbury and Southend section, and only a few 2–6–4T remain there as the majority of them have been released for urgent duty elsewhere. Midland Compound 4–4–0 engines have been seen on occasion working the Sunday through train from St. Pancras to Southend that runs on to L.T. and S. metals near Barking. Locomotives of this well known three-cylinder type have also been noted on heavy freight or perishable trains on the Western division.

"Patriot" 4–6–0s long had the monopoly of Longsight (Manchester) express turns in several directions, but "Jubilees" have now taken over some of their duties and the "Patriots" are more scattered. The "Patriots" have the long parallel boiler previously fitted to 20 rebuilt "Claughtons," with three cylinders, Walschaerts gear and long-lap valves, exactly as employed on the "Royal Scots." The result is a powerful and handsome locomotive that is within the weight limits of practically all L.M.S. main lines, and also of the Stoke route over former North Staffordshire lines between Euston, Rugby and Manchester.

The "Patriots" came into service as somewhat drastic rebuildings of "Claughton" 4–6–0 engines between 1930 and 1933. Crewe turned out 10 new engines to the same dimensions in 1934, making 52 in all, now numbered 5500–51 and often known as "Baby Scots." A number of them carry names familiar on "Claughton" and previous L.N.W.R. engines while several others have nameplates commemorating Regimental titles.

The two rebuilt "5XP" Stanier 4–6–0s, Nos. 5735/6, which have 250 lb. per sq. in. boiler pressure, are reported to be doing good work on Leeds-Bristol expresses.

New American Locomotives for the Allies

Powerful oil-burning 2–8–2 locomotives are being built to the order of the British Ministry of Supply in the United States for service on various standard gauge railways in the Middle East. The general design permits of either oil fuel or bituminous coal being used to raise steam, as there is a spacious grate. The engines have a parallel sided superheater boiler pressed to 200 lb. per sq. in., two outside cylinders 21 in. diameter with a 28 in. stroke, 10 in. piston valves, Walschaerts gear, and 5 ft. coupled wheels. Liberal mechanical lubrication is provided for; steam brakes act on engine and tender wheels, with either Continental air brake or vacuum for train working.

Briquettes Save Coal

Fuel briquettes are being used experimentally on L.N.E.R. locomotives hauling certain freight or local passenger trains. So far they have proved satisfactory, no difficulty being experienced in maintaining pressure. The briquettes are composed of coal dust, sawdust and tar or petroleum residue. They are mixed in the tender or bunker approximately in the proportion of 25 per cent. briquette and 75 per cent. ordinary steam coal. Briquettes are a normal form of locomotive fuel in France and other Continental countries at all times.

Smart Cross-Country Running

While main-line locomotive performance under wartime conditions has been almost universally affected by heavier loads and easier schedules, there are many cross-country routes on which performance is practically at peace-time level, inasmuch as loads have been increased while schedules remain largely unchanged. Consequently many of these erstwhile "minor" routes possess considerable attraction for the enthusiast under present conditions.

L.M.S. engine running on the L.N.E.R. at Stroud Green, on the High Barnet line. These engines do not now run to Barnet, as part of the line is electrified.

As an example of contemporary cross-country performance, the writer recently recorded some quite smart running in the course of a journey from South Wales to the South Coast—initially in the 10.30 a.m. through train from Cardiff to Portsmouth, which is worked from its starting-point to Salisbury by a G. W. "Hall" 4–6–0. With a load of 10 coaches, 315 tons gross, 5945 "*Leckhampton Hall*" put up its fastest running down the Wylye Valley from Warminster to Salisbury, covering the 17.5 miles from Warminster to a signal stop beyond Wilton in exactly 19½ min. at a start-to-stop average speed of almost exactly 54 m.p.h., and this despite a preliminary severe signal slack at Wishford. The 6.2 miles between Heytesbury and Wylye were run at an average speed of 68.2 m.p.h., with a maximum of 74 m.p.h.

Continuing from Salisbury by the Plymouth - Brighton through train, two ex-L.S.W.R. 4–4–0s (No. 464 of Class D.15 piloted by No. 314 of Class T.9) were provided for a packed 12-car train of 410 tons gross, and they had no difficulty in gaining 3¼ min. on schedule between Salisbury and Portsmouth. After a careful exit over the sinuous approach to Salisbury, the two engines maintained 38 m.p.h. up the two miles at 1 in 150 to Alderbury Junction, and then ran freely down the easy gradients to the outskirts of Southampton, attaining 65 m.p.h. before and 60 m.p.h. after the 40 m.p.h. service slack through Romsey. The 24.6 miles occupied 32¾ min.

D. S. Barrie.

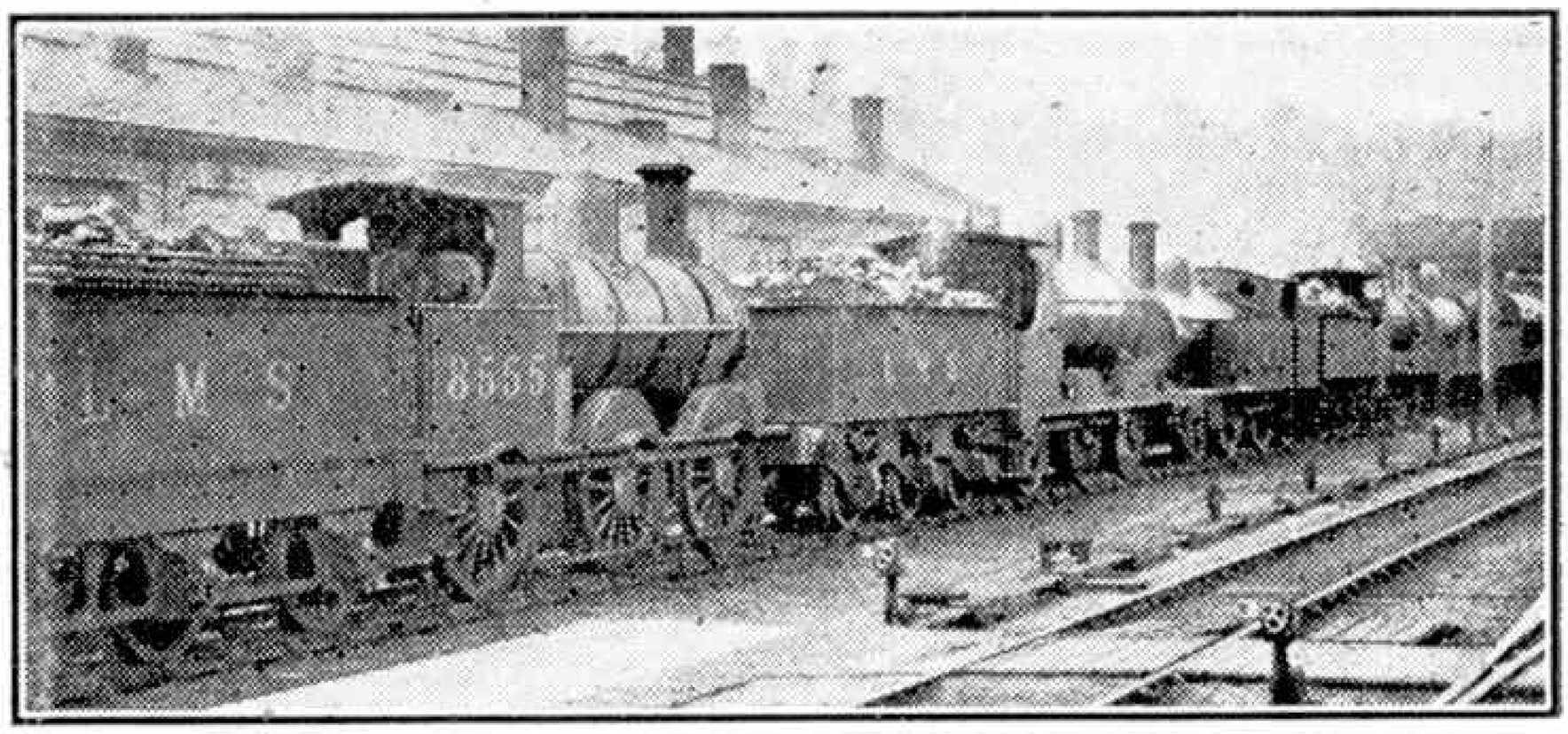
L.N.E.R. Running News

It is interesting to note that many of the original "A1" Gresley 4–6–2 express engines have now been converted to "A3s" by the fitting of 180 lb. per sq. in. boilers, larger superheaters, and cylinders reduced in diameter from 20 to 19 in. This is in accordance with the "A3" standard, which has proved so efficient in the locomotives so built. When the first "A1" engines were given 220 lb. per sq. in. boilers 15 years ago they retained their 20 in. cylinders.

Early one morning recently the streamlined "Pacific" hauling a mail train to King's Cross had to be detached at Hatfield on account of an overheated axle box, and was replaced by a "V2" 2–6–2 that was waiting ahead with a goods train for the mail to pass. In turn the "V2" was superseded by a G.N. type 0–6–2T, which was sent from Hatfield to Potters Bar to take over 50 loaded wagons that had to be started on the wrong side of the summit. When it had once got going, this "N2" tank engine of the sturdy superheater 1921 design ran down the bank "as fast as an express" with its heavy train, quickly making up some of the lost time on the way to Finsbury Park, where the train was run into the sidings. "N2" tank engines are banking heavy freight and other trains up the long climb to Woodhead Tunnel between Sheffield and Manchester.

Among many notable runs by the main portion of the southbound "*Flying Scotsman*" from Grantham to London this summer, with the present normal load of 20 heavily loaded corridor coaches, weighing some 660 tons or more were two by "A3" class "Pacifics" No. 4480 "*Enterprise*" and No. 2750 "*Papyrus*" respectively. In each case the 97½ miles from Stoke summit, after starting from Grantham, to passing Finsbury Park were covered in 109 min., which is good work over an undulating road with such a tremendous train and represents a gain o about 5 min. on schedule.

Although the erstwhile G.N. and G.E. joint line from Doncaster to March is easily graded, an exceptional load was recently noted on it. The through York-Colchester semi-express was loaded to 15 corridors, a bogie saloon and two big brake vans, probably 620 tons.



A Sunday morning scene at Bletchley, showing an assortment of pre-grouping engines. The photographs on this page are by W. S. Garth, Luton.

Traction Engines of Bygone Days

AN article on steam traction engines published in the March 1940 "*M.M.*" aroused unusual interest, both among older readers who were familiar with them in days gone by and among others who eagerly collect details and photographs of the fine old machines. Many readers wrote to join with the author in his regrets that these engines are disappearing, driven out by Diesel engine tractors and power plants, both on the road and in the fairground. Somehow these new engines do not have the fascination of the old-time traction engine, especially of the fairground type, with its canopy and gleaming brasswork, and a plate bearing the name that seemed to give it life and personality.

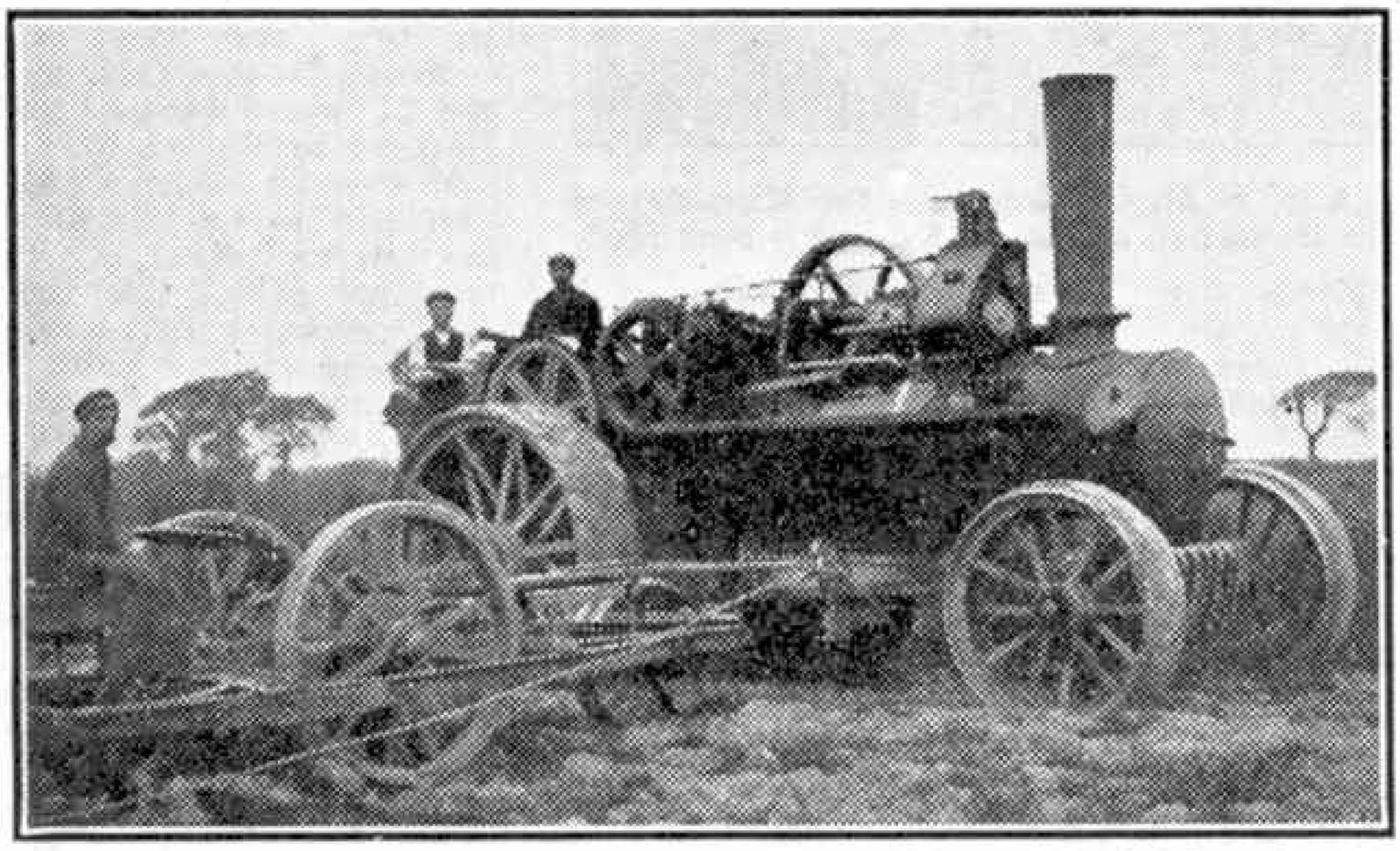
Some idea of the excitement that followed the arrival of one of these favourites is given by Mr. E. Instone, Bletchley, who writes: "We were always critical of the way in which the drivers pulled the heavy trailers through the small gateway. Some would take in one at a time; others would attempt to take a train of perhaps three wagons, including the steam organ, in one go. The third wagon nearly always jammed against the gate post so that often the post and fence were removed.

"The tractors were always parked close to the brook at the bottom of the field and obtained water direct from it. In those days the gondolas or motor cars on the scenic railway were driven round by a steam engine in the centre. The engine used water from large tanks. We children used to fetch water in buckets and water carts from the brook to fill the tanks, and in return were often given free tickets.

"It nearly always rained when the fair came, and often the caravans and even the tractors used to get stuck in the soft turf. I have seen as many as 30 boys and girls, helped by the fairground men, hauling on ropes trying to move caravans and wagons. I remember that one day the tractor had sunk in the soft ground and the showmen were throwing coconut sacks under the near side driving wheels to furnish a better grip. I had just read an article on the Meccano Traction Engine and had been impressed by the differential gear on the real thing, and I remember swelling with pride when I pointed out that the sacks ought to go under both wheels if the tractor was to be moved.

"One of our greatest thrills was when an engine driver whom we had 'adopted' allowed us to climb on to the footplate. The engine was gently rocking to and fro with the pulse of the pistons, the generators hummed, and beyond the darkness that surrounded the engine one could see the powerful lights of the fairground, hear the monotonous roar of the large organ and the cries of the showmen and merrymakers. It was an experience I never forgot, and the smell of a working steam engine always reminds me of it. It seems a shame that these giants are fading away, just as the fine gilded caravans are."

It was not only in the fairground that the traction engine exerted its fascination, for in the countryside, whether engaged in road rolling, in driving a threshing machine or in ploughing, it always attracted the interest of a little crowd, especially children. There was another side to this fascination, for the driver invariably took the greatest pride in his engine, and thoroughly enjoyed the task of manœuvring it and of keeping it in the finest possible condition. Road and farm traction engines were perhaps not so lavishly adorned as those to be seen in fairgrounds, and their chimneys did not project through mysterious canopies. This made little difference, however, and the life of a traction engine driver, especially one who lived "on the road," was a very happy one. At all events this is the verdict of Mr. A. C. Batchelor, Dulwich Village, who experienced it in the heyday of the traction engine. "When I was young," he writes, "I travelled about the country with different kinds of engines. At 18 years of age I was driving a 10-ton Fowler roller at Honiton, Devon, and I lived in caravans for seven years, sometimes with steam plough tackle or on traction work, which included hauling timber and flints for road making, and in the winter months working with rollers.

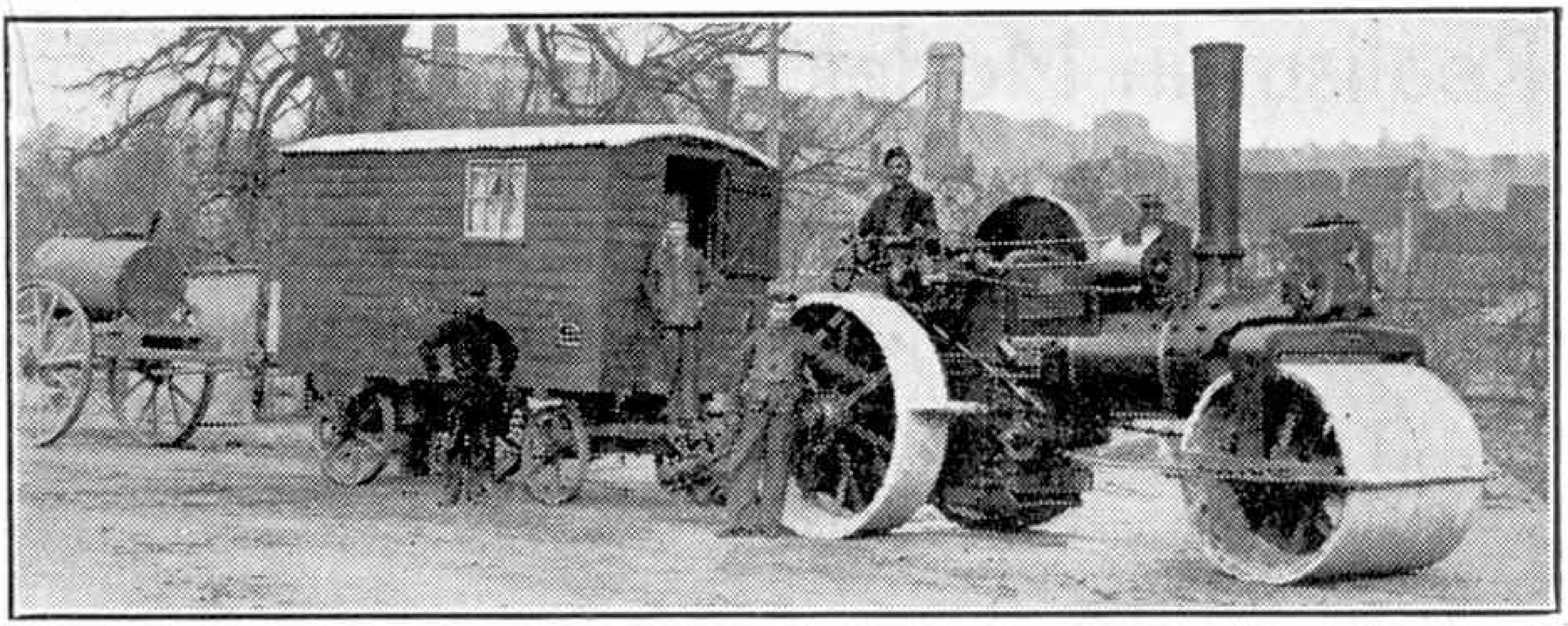


An agricultural traction engine at work. The tackle used included a plough, cultivator drags, harrows, presser and sometimes a roller.

"Travelling about as I did I came across lots of queer engines. I remember seeing a Brown and May's of Devizes, and I also saw an old Howard working at Alton, Hampshire, driving a circular saw. I remember seeing a Hornsby traction engine, the only one of this type I have ever met, threshing in Sussex; and meeting with a showman's cavalcade hauled by a 'Savage' engine, when I was driving a road roller. I once drove a Fowler centre traction engine, that is one that stood in the centre of the roundabout, which was built up around the engine and driven by it.

"I had three years and nine months in the last war driving caterpillars attached to the Garrison Artillery, but I suppose I am too old now at 57, so must be content to drive my Marshall Diesel, but for all that I still love the steamers. What better music is there than the beat of the exhaust of a single cylinder ploughing engine?"

More reminiscences of traction engines come from Mr. G. A. Tucker, Portsmouth, an enthusiast who has spared no effort in tracing details of as many different types of traction engines as possible and in obtaining photographs of them. For this purpose he has haunted fairgrounds whenever he has had the opportunity. It is not always easy to obtain good photographs, and in his efforts to secure both near and off side views of some particular engine he has sometimes taken one or two years, tracking it down to different fairgrounds in the hope of finding it showing the side he wanted in a position in which it could easily



A road roller leaving the Winchester City Council depot for London. For this photograph and the one on the opposite page we are indebted to A. C. Batchelor, Dulwich Village.

be photographed. Sometimes crowds of people were in the way; at others the engine was hemmed in by caravans or perhaps swathed in tarpaulins.

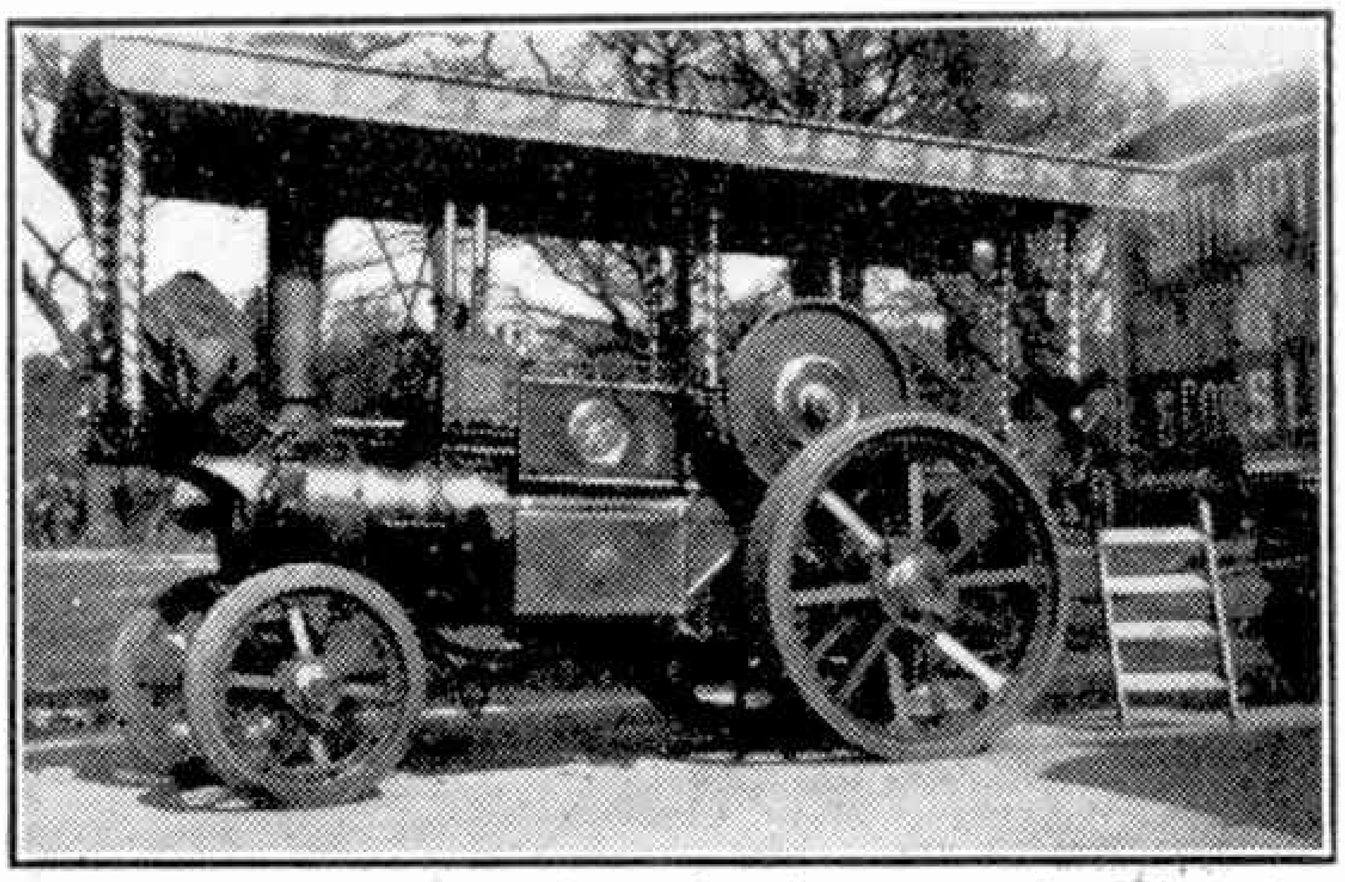
One of Mr. Tucker's photographs is reproduced in the lower illustration on this page. It shows a small Burrell tractor of the kind used by some showman as a shunting engine, the dynamo mounted on it being kept as a stand-by. Engines of this kind are employed in marshalling the trailers, ready for the larger engines to haul away, and during the erection of large roundabouts. They weigh about 6½ tons, and thus do not damage the ground so much. When on the road they usually pull the lighter caravans.

Writing of these engines Mr. Tucker says: "Canopy stanchions and ornamental work varied considerably on Burrells, and so did nameplates. The names were as romantic as those of railway engines, including Kings, Princes, and Earls, and the plates were of cast brass. The owner's name and address was often on the tool box, and the maker's name was on the front of the dynamo seating, on the cylinders, and on the back wheel hubs. A favourite ornament on Burrells was a circle and star on the dust plate, a brass circle on the flat flywheel, or a star on the near side of the boiler tank. Brass fluted stanchions and stays were fitted to order, but some are entirely devoid of decoration. Even the brake wheel spindle was sometimes fluted, but for some reason several Burrell engines did not have ornamental tender stanchions. Canopy stanchions varied in number from six to eight. Where there were six stanchions the middle ones were almost invariably on 'horn plates,' extensions upward of the fire-box sides to take bearings, with inclined stays; but in the eight-stanchion type the second pair from the front were either based on the pads on the boiler, or on top of the cylinder block. Lagging casings on the valve and cylinder covers, with brass stars, were sometimes used, and ornamental caps on top of the chimneys were popular with Burrells."

Mr. Tucker has some interesting notes on the use of rubber on the wheels of traction engines. The old timers clanked noisily and cheerfully forward on paved roads, but "since 1926 traction engines have had to have their wheels fitted with rubber blocks. In some large engines there was so little clearance between the overhang of the flywheel shaft and the wheel rim that an inner circle of blocks had to be omitted. The older timber-built trailer wheels and forecarriages were works of art, even though the brake blocks were crude, and looked far better than six-spoked cast steel wheels with tyres worn almost away!" Agricultural engines are still in use with their original iron straked wheels, as they travel so rarely on roads.

"Pneumatic tyres have made their appearance in fairgrounds since 1938. This is probably due to the fact that wood wheels and solid rubber wheels are more difficult to obtain. One day I came across a most disreputable old Burrell showman's engine with balloon tyres from an old lorry on its front wheels! It looked quaint.

"Some tractors in fairgrounds are conversions from old haulage engines, a dynamo seat and a long canopy having been fitted locally and not by the makers. Many engines are of a great age, the boilers of certain of them having been known to last about 50 years. Probably, with rebuilds and added accessories, few engines, even of the same make, are exactly alike in detail to-day. It is a great pity that steam vehicles have been almost taxed off the roads. About the period 1923 to 1926 some makers of steam wagons tried to revive the steam tractor in modern form. This principally was a shortened edition of a steam wagon, with larger back wheels, and a big water tank in place of the body."



A showman's traction engine, with six canopy stanchions, by Burrell, Thetford, Norfolk. Photograph by G. A. Tucker.

The engines are usually classified by their powers, the cylinder diameter of a 6 h.p. machine being 8 in., that of a 7 h.p. engine 8½ in. and that of an 8 h.p. 9 in. The stroke generally is 12 in., and steam pressure 120 to 180 lb. per sq. in.

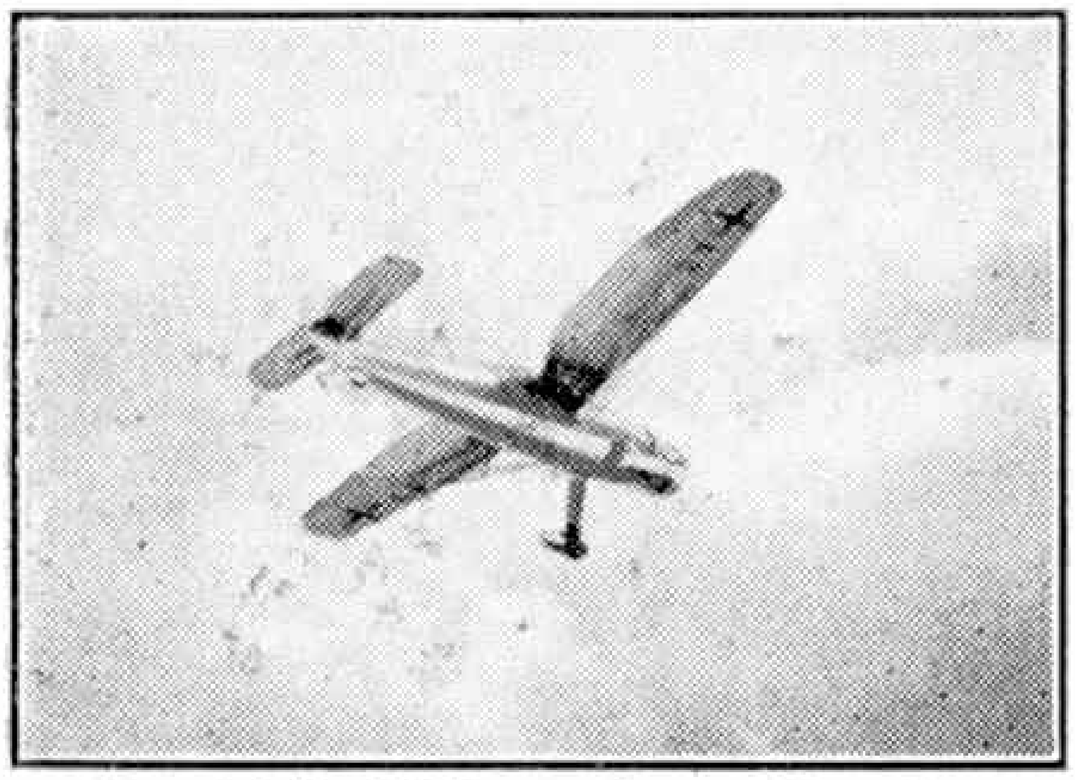
Realism in Model Photography

By S. E. Low

ENTHUSIASTIC aero modellers will without doubt have endeavoured to record the result of their labours by means of photography, but how seldom have the pictures of these triumphs of the model engineer's skill been made to appear as if the craft were really flying. Here are a few hints and tips on how to create realistic air pictures.

The first thing to be done is to secure a cloud background. This may be an enlarged cloud photo, as was used in the illustration of the Henschel Hs.126 reconnaissance monoplane, and it is strongly recommended that two or three cloud negatives should be made as a preliminary to starting model aeroplane photography. If, however, cloud enlargements are not available, a suitable background can be made with white paper, size about 40 in. by 30 in. placed behind the model and lit with a subdued light. This was done in the "Hurricane IIc" picture.

There are several methods of suspending the models in front of the background, but probably the easiest is by using grey or white cotton. The model should be slung in a flying attitude about 12 to 14 inches away from the background, which is of course attached to the wall. The background should be lit, if possible, with four 25 watt shaded lights. The position of the lights will have to be determined by trial and error, and by reference to the ground-glass screen of the camera. It is, of course, important that the background is evenly illuminated, and that there are no shadows crossing it. The lighting of the model should be done with one light source only, to represent the sun. If possible the light should be of the spot-light type and in the region of 250 watts. This light will be above the model, and here again trial and error must determine the best position. It is very important to secure the characteristic flying attitude of the aircraft, the best viewpoint to illustrate the

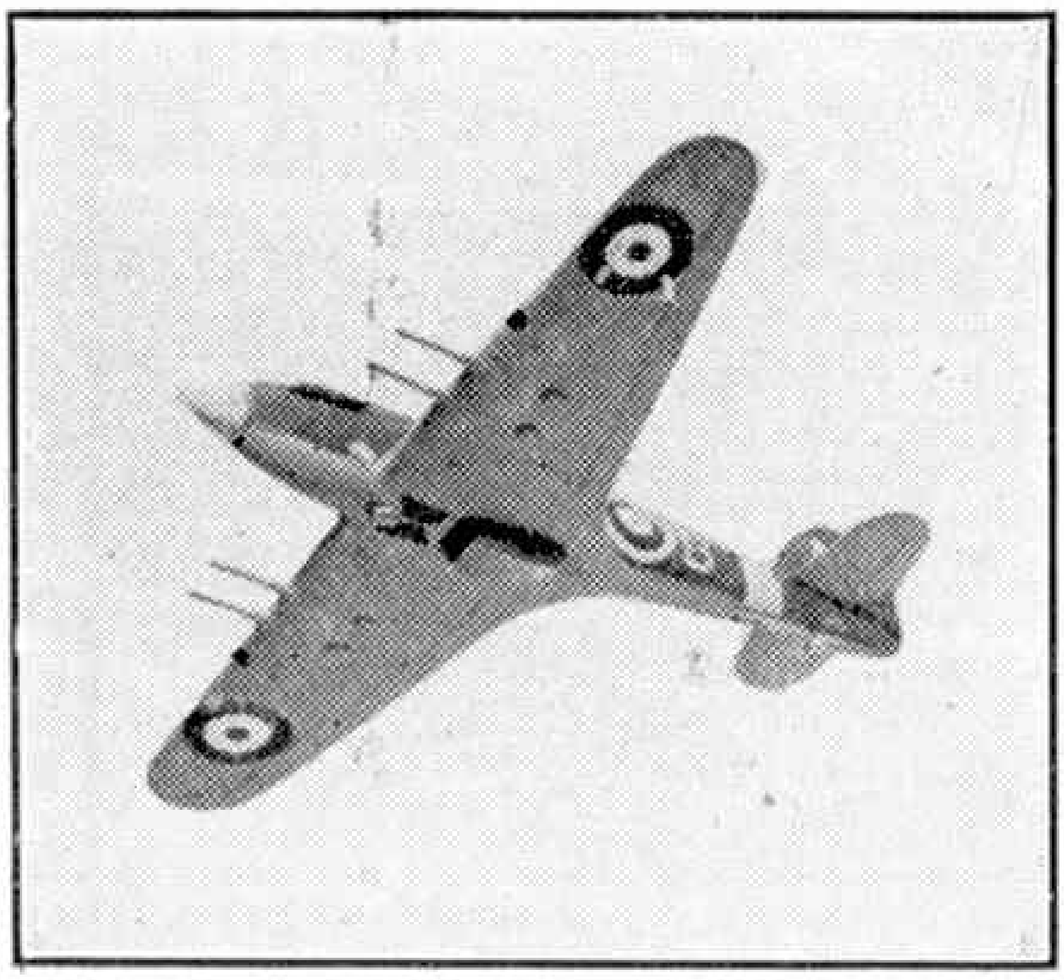


Henschel Hs 126 Reconnaissance Monoplane

salient features of the type of aircraft you are photographing, and the most complimentary lighting of the model. This last is most important, and it will be best always to light the model from the top.

The next consideration is the camera. The best camera for this work is one of the focussing type, that is a focussing folding camera, miniature reflex, or one of the Sanderson ¼-plate type cameras.

The camera should be supported on a firm tripod, and a ball-and-socket head will be found a very great advantage if fitted to the tripod top. The viewpoint having been selected, the camera should be set up



Hawker "Hurricane IIc" Fighter.

and focussed on the model, care being taken to see that the principal point of focus should be the main centre of interest, that is the nose of the aircraft or gun turret. Care should be taken also to see that none of the background is cut off when the camera is in position. The lens should now be stopped down to F/16 and an exposure made of about 30 seconds on a medium speed plate or roll film, such as the Selochrome plate or Selochrome roll film.

Great care should be taken to see that the model is quite steady before the exposure is made, as the least movement will cause a blurred image. All windows and doors should be shut, and it is advisable that all movement in the room should be stopped while the exposure is being made.

Very effective photographs can be made also of models on the ground out of doors, provided that a suitable background is selected. The most effective is one where an uninterrupted view of the distance is obtained. The model should be placed on a smooth ground, such as cement or tarmac to represent an aerodrome surface. The camera can be of the box type, fitted with a portrait attachment over the lens, and loaded with a film of the Selochrome type. The exposure would be in the nature of 1/25th second at F/11, or an instantaneous exposure with the smallest stop on a box camera.

It is of great importance that models should be as accurate as possible, as the photographic lens is very hard on those enthusiasts who do not trouble about the "finish" of their work. Nothing gives away table-top photographs more easily than careless painting or hasty covering of wings and fuselage with Jap tissue.

The enthusiast who builds up his scale model by means of Balsa wood construction very often feels that the model shows far more "work" before it is covered with Jap tissue. Good photographs of work at this stage of construction can be taken with the method first described, the only difference being that the white background should be replaced with a piece of black paper, the model being suspended with black cotton. These cottons, by the way, are best left until the photographic print is made. They should then be touched out with a fine-pointed camel-hair brush and some water-colour lampblack paint. This is a skilled job and great patience is needed in making these cottons invisible, but it can be done, and very effectively.

The models used in the illustrations were made by Mr. V. J. G. Woodason of Woodason Aircraft Models, Heston, Middlesex, and they represent a very high degree of skill in this fascinating art of scale model making. Readers who possess any of the Meccano "Dinky Toys" aeroplanes will find these models also very suitable for photographic purposes.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

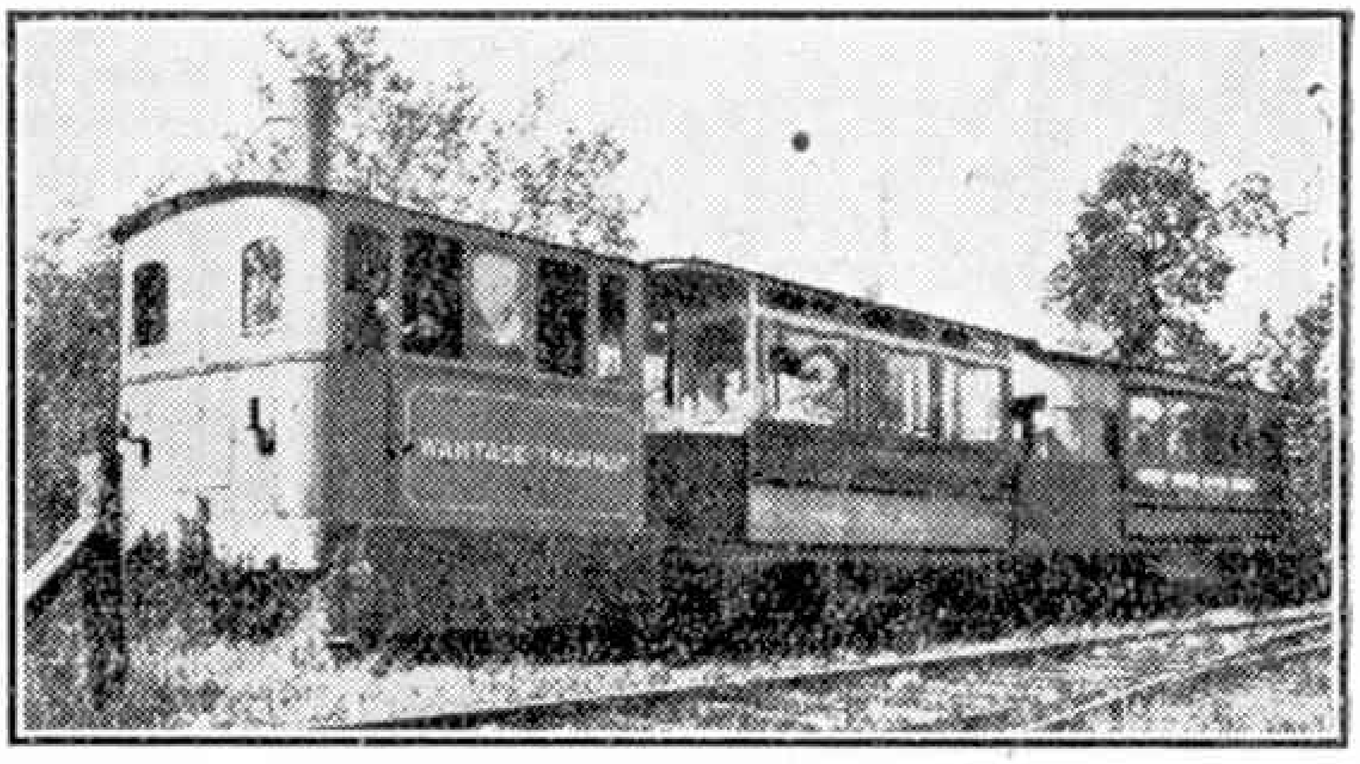
A GLIMPSE OF AN OLD STEAM TRAMWAY

An old steam tramway "carting agency," with some unique features, is that held by the Wantage Tramway Company in respect of the despatch of goods and transport of passengers to and from the old market town of Wantage, Berks. Wantage Road, the main line station of the Great Western Railway, is some 2½ miles from the town, and this old tramway of standard gauge runs largely alongside the main road, with rail connections to the G.W.R. sidings. It has its own terminus at the other end in the town of Wantage.

The inception of this tramway dates back to 22nd October 1873, when a meeting was held in the local town hall. As a result, the undertaking was started for the conveyance of both passengers and goods. Throughout its history ordinary railway wagons have been used for the transport of goods, and the locomotive power of two engines and carriages were provided by the tramway itself.

Over a period of some 50 years, up to 1925, a passenger tramway service was run between Wantage Town and Wantage Road G.W.R. Station, but in that year the passenger trams were withdrawn in favour of buses. The Tramway Company's locomotives still haul the goods traffic and the company act as agents with the G.W.R. Normally the locomotives work three trips a day and are controlled by a driver and a shunter.

R. Charles (London N.W.2).

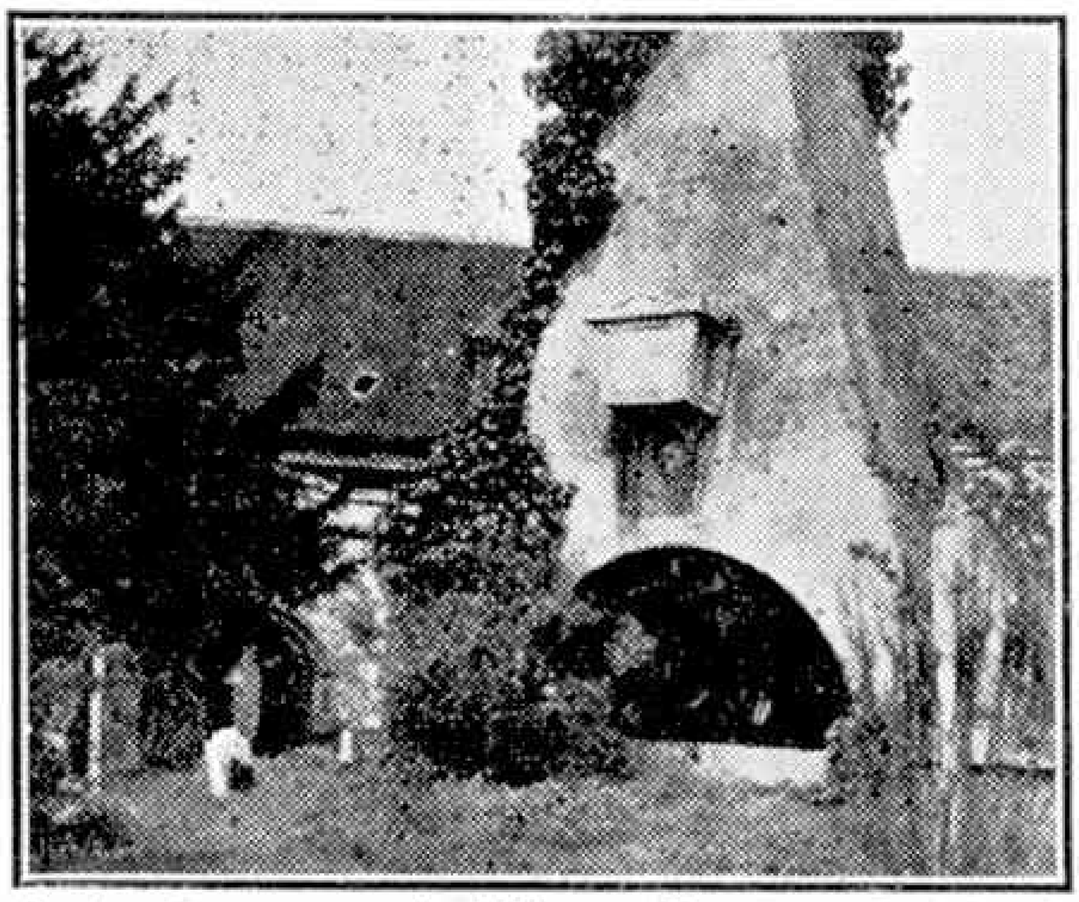


A locomotive on the Wantage Steam Tramway. Photograph by R. Charles, London N.W.2.

PHOTOGRAPHIC "FINDS" NEAR HOME

In these days when amateur photographers find their supply of films seriously reduced it is important to consider carefully every exposure. Further, travelling that is not really necessary must be avoided, and therefore photographic subjects must be found close at hand. It is surprising, when one really looks for it, how much of photographic interest there is within a few miles of home. Let me describe one of my "finds."

Pinner Village is a delightful old-world spot, yet it is only 11 miles from the centre of London, and can be reached by a pleasant bus ride. More than 40 years ago an American journalist touring this country happened to note a remarkable tomb that occupies a prominent place in Pinner churchyard. He made use of this in his story "*The man who is buried above ground*," which he sent to an American journal with a photograph of the tomb. Eventually the story appeared in an English publication, and while it may be a pity to spoil a good yarn it is as well for the truth to come out.



A strange monument at Pinner, the story of which is told on this page. Photograph by J. J. Curtis, A.R.P.S.

In 1809 a William Louden died and was buried in a vault in Pinner churchyard. His eccentric son erected to his father's memory, over the vault, the peculiar obelisk shown in the accompanying illustration. Penetrating the main structure is an additional piece of stonework shaped like a coffin and protruding on two sides for about two feet, giving the impression that the body is really buried above the ground. Actually the structure is so wide that the coffin would have fitted a man of about 10 ft. 6 in.

Within a few yards of this structure there is an old wooden beam marking the burying place of a William Skenelsby, who died in 1775 at the age of 118 years. It is on record that on one occasion, in order to help a young man who was with difficulty pushing a barrow on the High Street, William, who was then over 100 years, took the barrow away from the young fellow and did the job for him!

I hope this yarn may encourage readers to look for out-of-the-ordinary things in their own neighbourhood.

John J. Curtis, A.R.P.S.

AN UNUSUAL CHEMICAL FACTORY

Some time ago I paid a most interesting visit to a factory where valuable medicinal substances are obtained by percolating alcohol or water through herbs. This is done in wooden copper-lined vats, and the liquid produced is sold in this form, or is evaporated to form an extract. If too high a temperature would be harmful the liquid is evaporated under reduced air pressure, which lowers its boiling-point. Lavender water was being distilled when I visited the factory.

J. E. Sanders (Hitchin).

Suggestions Section

By "Spanner"

(566) Three-Movement Ratchet Mechanism

("Spanner")

Fig. 566 shows a novel ratchet mechanism that will provide three different rates of feed, and can be applied to many kinds of models, especially model machine tools.

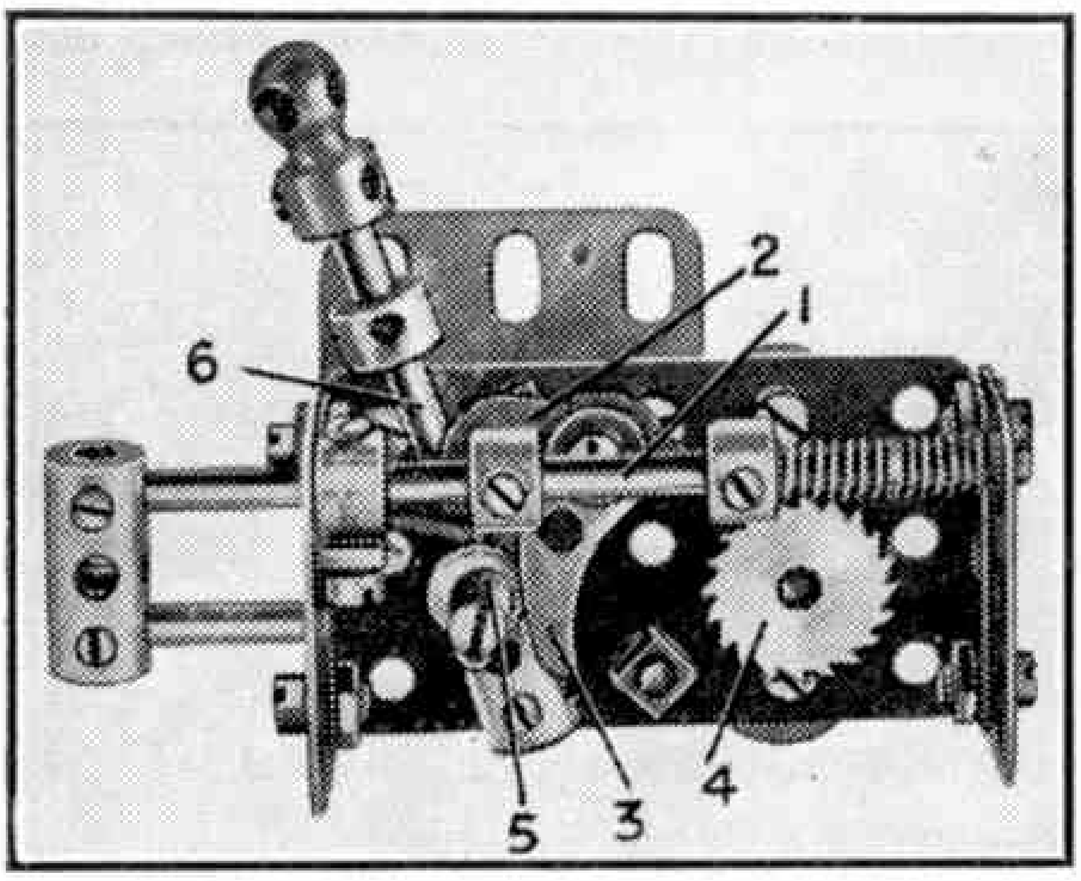


Fig. 566.

The device consists of a Rod 1 that is free to slide longitudinally in two 1½" Flat Girders bolted to a 2½" × 1½" Flanged Plate, and which carries a Pawl without boss 2, lock-nutted to a Collar mounted on its Rod. This Pawl is bolted to a second Pawl without boss 3, which is connected by a short length of Spring Cord to a second Collar on Rod 1. Pawl 2 therefore is spring-actuated, and it engages the teeth of a Ratchet Wheel 4 on the driven Rod, which is fitted with a ratchet mechanism on its other end to prevent it from rotating in two directions. This arrangement is shown in Fig. 566a. The Pawl 3 makes contact with a Cord Anchoring Spring 5, secured by a ⅜" Bolt to a Coupling lock-nutted pivotally to the Flanged Plate and fitted with a Rod 6 that forms the selector lever. This lever is held in any of three positions by a $\frac{7}{32}$" Grub Screw inserted in a Collar mounted on the Rod, and engaging in the elongated holes of a 1½" Flat Girder bolted in the position shown.

When the lever 6 is pulled to the left, as shown in the illustration, and the Rod 1 is pushed inward, the Pawl 2 rotates the Ratchet Wheel 4 through an angular distance corresponding to three of its teeth. If the lever is placed centrally and the Rod 1 is pushed inward, the Ratchet Wheel is rotated through a distance of two teeth, and when the lever is pushed over to the right the Ratchet moves through the distance of one tooth on operation of Rod 1.

(567) A Full Wave Alternating Current Rectifier

(N. C. Ta' Bois, Woodford Green)

Figs. 567 and 567a on the next page show an interesting full-wave alternating current rectifier designed by N. C. Ta' Bois, Woodford Green. It was intended for use with a direct current motor incorporated in a model trolleybus for steering the vehicle, the idea being that by reversing the direction of the current the vehicle could be steered to right or left as desired.

The apparatus consists of a commutator driven by an E6 Electric Motor, the speed of which is governed by a synchronous motor. The commutator consists of eight ½" 6BA Bolts, each of which is fitted with an Insulating Bush, while every alternate one also carries an Insulating Washer. The eight Bolts are bolted in the holes of a Bush Wheel, as shown in Fig. 567, and the four insulated Bolts have a second Bush Wheel attached to them by Nuts. This second Bush Wheel must not be in contact with the 6½" Rod on which the first Bush Wheel is mounted. An insulated Pendulum Connection mounted on an Angle Bracket and a Screwed Rod, as shown in Fig. 567, makes contact with the rim of the second Bush Wheel. This Pendulum Connection is connected by a wire to one of the two terminals 1 on the

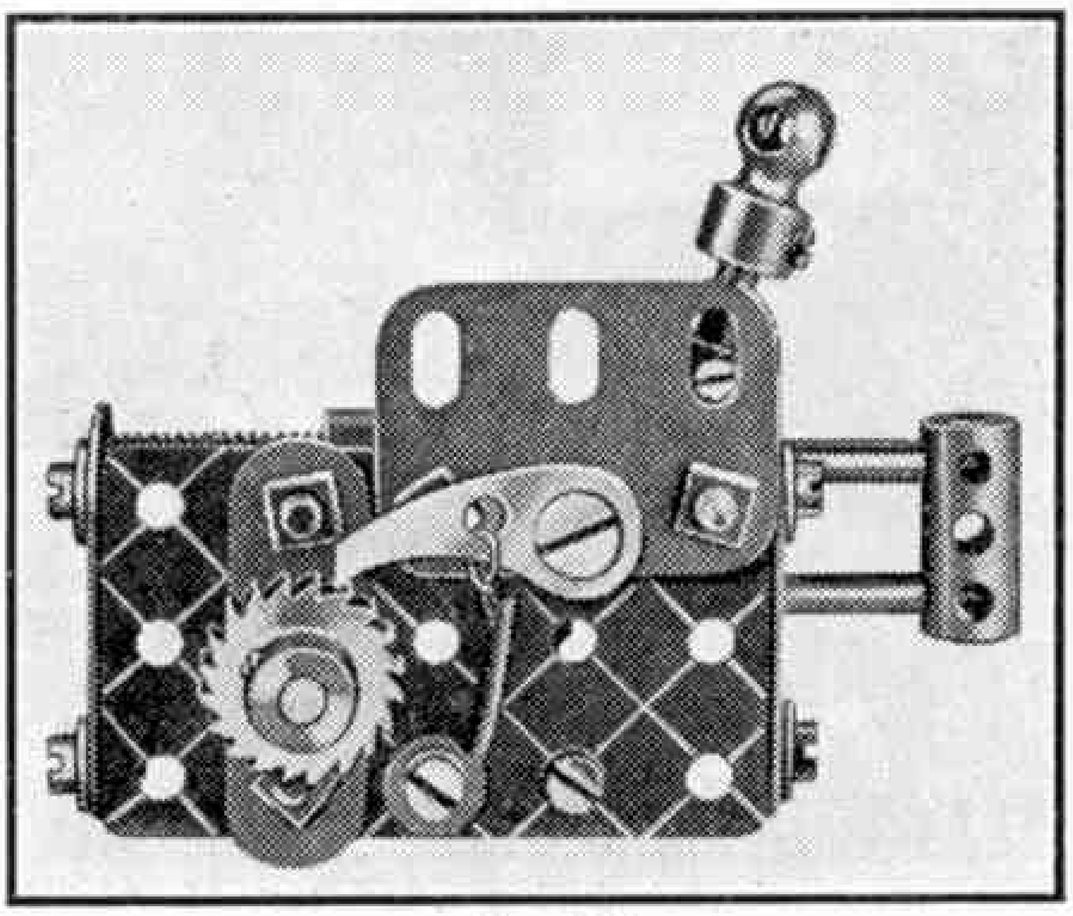


Fig. 566a.

E6 Motor, the other terminal being earthed. The direct current output is taken from these terminals.

The alternating current input is conveyed to the terminals 2, also mounted on

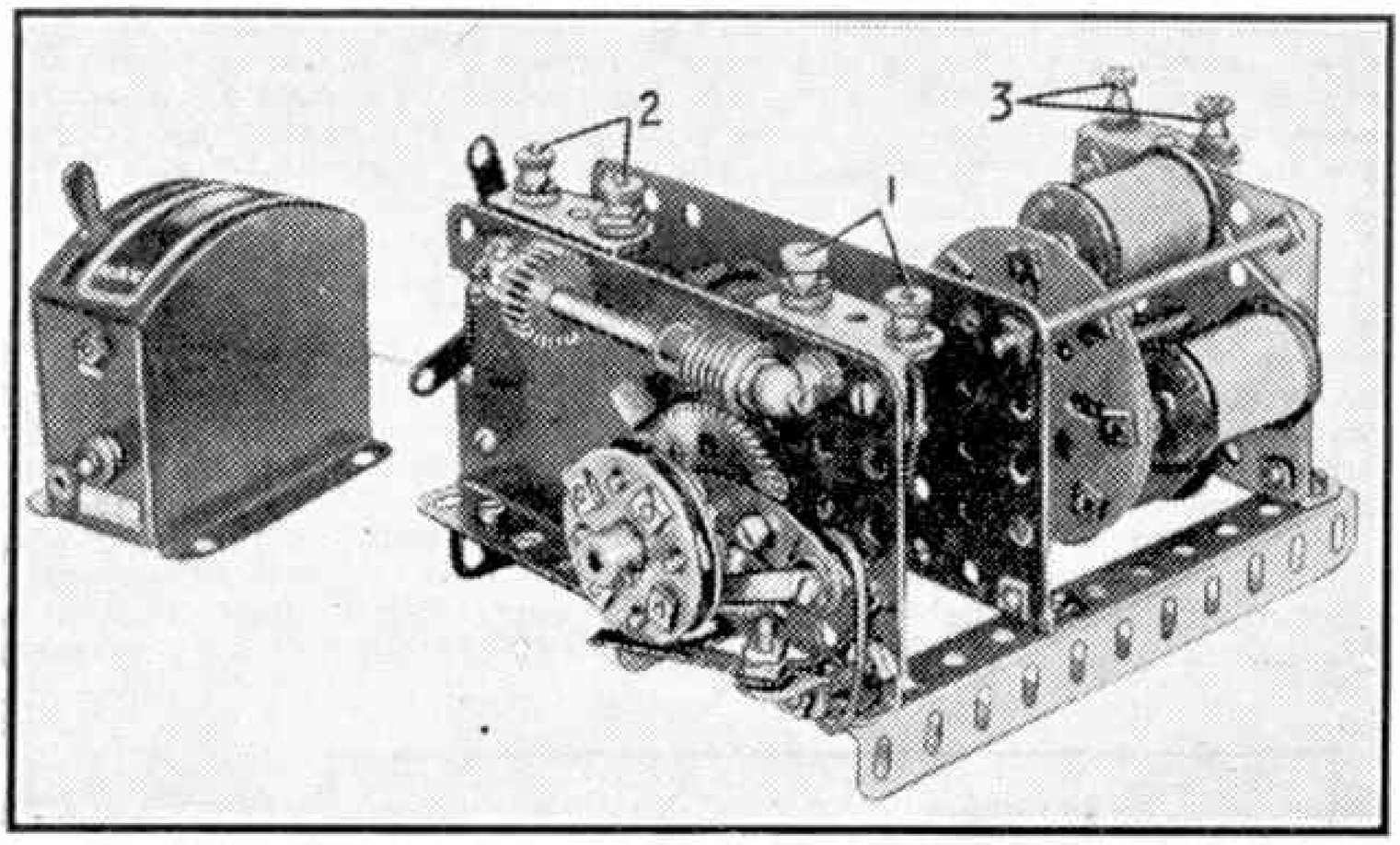


Fig. 567.

the E6 Motor. These are insulated, and are connected to two Pendulum Connections attached to a 2½" Cranked Curved Strip by Insulating Bushes and Washers. These Pendulum Connections act as brushes, making contact with the "segments" or Bolts of the commutator, and are arranged so that one of them is in contact with an insulated Bolt when the other is in contact with an "earthed" one. It is advisable to arrange that the brushes are momentarily out of contact with any Bolts at the time of change-over; otherwise short circuits may result.

The Curved Strip already mentioned is bolted to a 57-teeth Gear Wheel mounted freely on the 6½" Rod. The Gear is rotated by a Worm on a short Rod mounted in Handrail Supports. A ¾" Pinion forms a handwheel to facilitate rotation of the Worm, the object of this arrangement being to allow the brushes to be brought into correct relationship with the segment Bolts of the commutator. The correct position is indicated when "sparking" at the brushes is at a minimum, and when the rectified voltage is at its maximum, as shown by a direct current voltmeter. The 6½" Rod is driven from the E6 Motor through a 3 : 1 ratio reduction gear.

The synchronous motor consists of four Elektron Electro-magnets bolted to a 2½" × 2½" Flat Plate. The Electro-magnets are wired in series, and are connected to the insulated terminals 3 attached to the 2½" × 2½" Flat Plate. The rotor is formed from a Face Plate, to which are fixed eight Bolts, each carrying three Washers.

To use the rectifier the E6 Motor and the synchronous motor are connected to a T26M Transformer, and a rheostat or Resistance Controller is connected in series with the former. The speed of the E6 Motor must be adjusted to approximately 750 r.p.m. If the speed is slightly higher or lower than this, the synchronous motor will then slow it down or speed it up respectively to the exact speed.

The alternating current input terminals 2 should be connected to the terminals of a second 6-volt Transformer, as one T26M. Transformer does not supply the total current required.

(568) Control Cable for Brakes
("Spanner")

Model-builders are familiar with the Bowden Wire Control for brakes. This system of brake operation is very useful in model-building, and it can be reproduced by using a length of Spring Cord, the ends of which are clamped between Strips or in a Collar. A length of thin wire is passed through the centre of the Cord, one end of this being attached to the operating lever and the other to the brake shoe.

This idea can be applied in many ways, and will work smoothly even when the cable is taken around sharp bends.

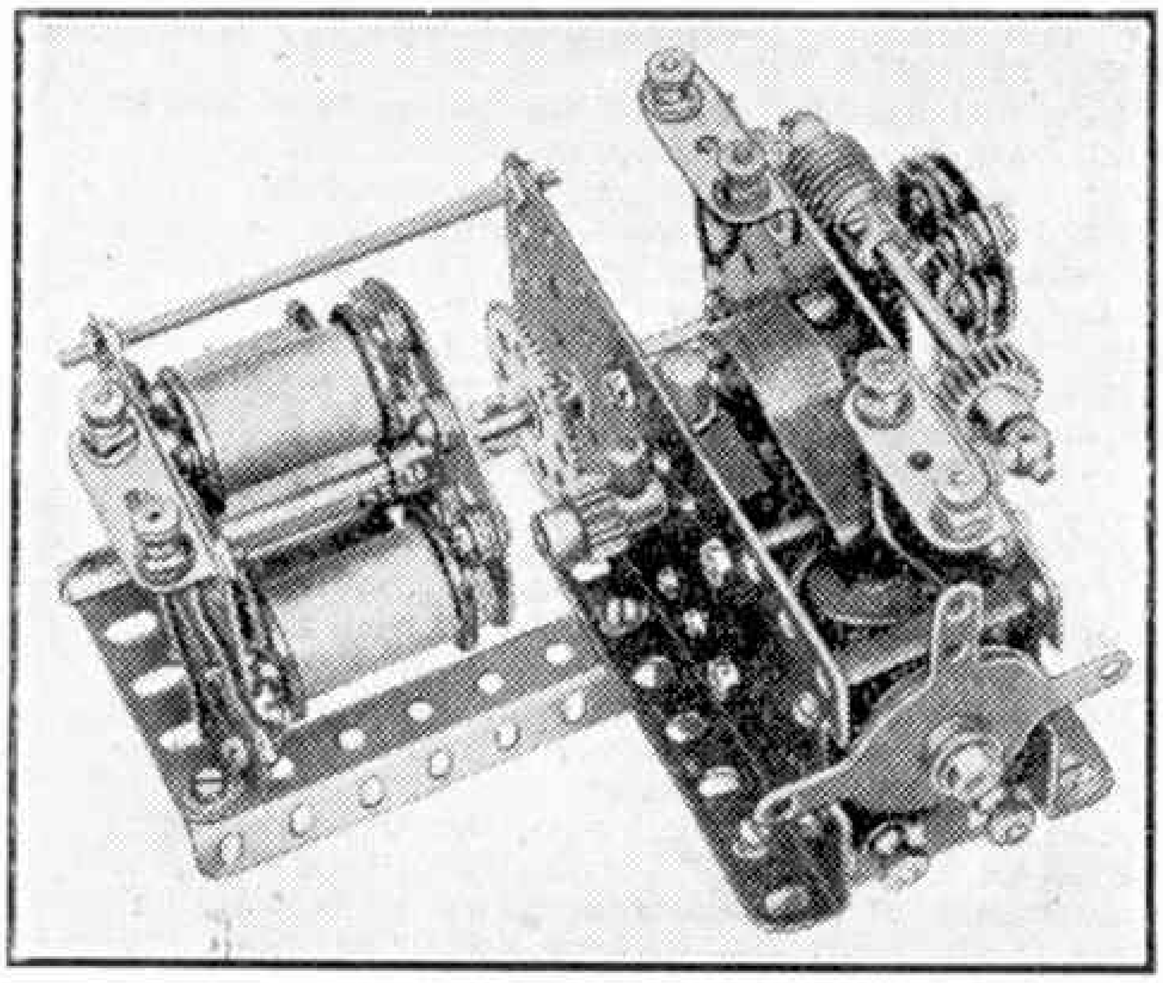


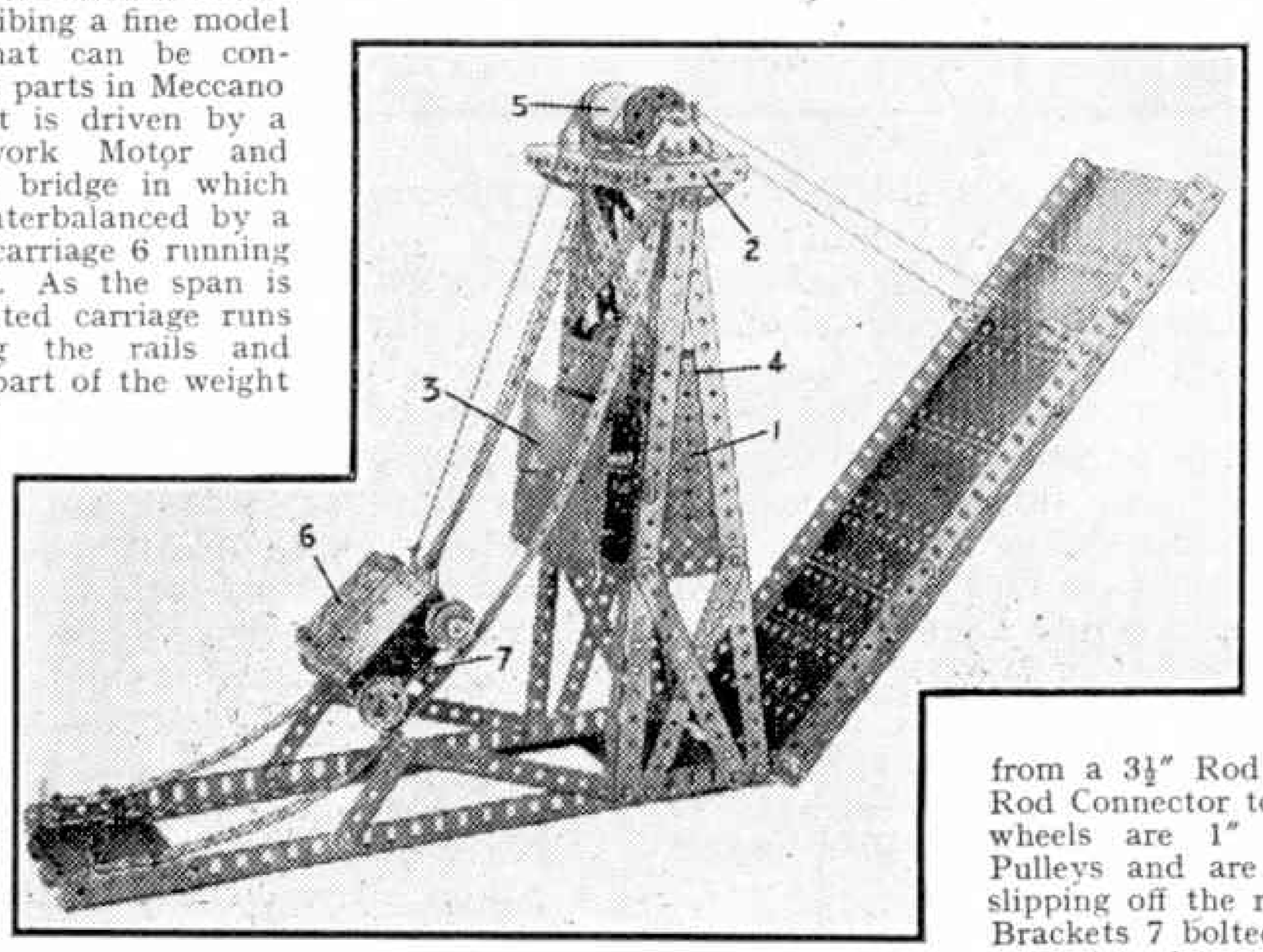
Fig. 567a.

A New Meccano Model

Hinged Lift Bridge Built with No. 5 Outfit

INLAND waterways such as navigable rivers, ship canals and dock connections, cannot always be provided with ordinary fixed bridges of sufficient height to allow the passage of ships with tall masts and funnels. Passage over them for road or rail traffic therefore is given by the construction of bridges that can be swung round or lifted out of the way when necessary. There are several different types of these movable bridges, each of which is specially designed to suit the particular geographical and traffic conditions at the site where a bridge is required. The hinged lift bridge is one of the most interesting of these. Examples of this are not numerous in Great Britain, but there are many in Canada and other countries, many of which have been described in the "*M.M.*"

The mechanical and constructional features of these bridges make them splendid subjects for the Meccano model-builder. This month therefore we are describing a fine model of this kind that can be constructed from the parts in Meccano Outfit No. 5. It is driven by a No. 1a Clockwork Motor and represents a lift bridge in which the span is counterbalanced by a heavy weighted carriage 6 running on inclined rails. As the span is raised the weighted carriage runs downward along the rails and helps to absorb part of the weight of the span, so that comparatively little effort is required for the lifting operation. As the span is lowered the carriage is hauled back to the top of the rails.



How to build this fine model of a hinged lift bridge is explained on this page. It is very realistic in operation.

The base of the model consists of two 12½" Angle Girders lengthened at their rear ends by 2½" Strips, and spaced apart by the halves of a Hinged Flat Plate fixed at each end, as shown. The tower is next constructed and attached to the base. It is formed from four 12½" angle girders, each of which is built up from two 12½" Strips. These are attached to the forward end of the base in the position shown, and to them are bolted 4½" Flanged Sector Plates 1, which form the sides of the operating cabin. The upper ends of the girders are bolted to 2½" Cranked Curved Strips, and are connected by Flat Brackets to 2½"×½" Double Angle Strips, to the ends of which a 5½"×2½" Flanged Plate 2 is fixed to form the platform.

The operating cabin is completed by bolting in front a 4½"×2½" Flexible Plate overlapped with a 4½"×2½" compound flexible plate formed from two 2½"×2½" Flexible Plates. The back of the cabin is represented by a No. 1a Clockwork Motor 3, which is bolted to two 2½"×1½" Flexible Plates.

The drive is transmitted from the driving shaft of the Motor through a 2½" Driving Band to a ½" Pulley locked on a 3" Screwed Rod, which is journalled in holes in the front and back of the cabin. This Rod is then connected by a 6" Driving Band to a 1" Pulley fixed on a 5" Rod 4 mounted in the Plates 1. A second 1" Pulley on this Rod is connected by a length of Cord to a further 1" Pulley mounted on the shaft of the winding drum 5, by means of which the span is raised and lowered. The drum consists of a 2½" Cylinder held between a Bush Wheel and a 1½" Disc on a 5" Rod, which is journalled in Trunnions mounted on the platform 2. The tower is completed by bracing it with 5½" Strips as shown in the illustration.

Rails for the counterweight consist of two 12½" Strips lengthened at their rear ends by 5½" and 1½" Strips, and attached at their front ends to the top of the tower. Their rear ends are fixed to the base by ½" Reversed Angle Brackets, and are provided with a stop formed from ½"×½" Angle Brackets. The rails are braced by 5½" and 2½" Strips attached to the base and fixed to the rails in the position shown by ½"×½" Angle Brackets. The counterweight 6 is formed from two 2½"×2½" Flexible Plates bent over and bolted to a 4½"×2½" and two 2½"×1½" Flexible Plates to form a rectangular block 2½"×3½"×1" deep. The Flexible Plates are strengthened by two 3½" Strips bolted to two 2½"×½" Angle Strips, and they provide bearings for the axles of the travelling wheels.

These axles are 4½" long, one of them being formed from a 3½" Rod connected by a Rod Connector to a 1" Rod. The wheels are 1" fast and loose Pulleys and are prevented from slipping off the rails by two Flat Brackets 7 bolted to the sides of the weight, but spaced by Washers.

The model is completed by the construction of the span, which is formed from two 12½" Angle Girders lengthened by 5½" Strips, with four 5½"×1½" and four 5½"×2½" Flexible Plates between them to form the carriageway. The span is pivoted on two 1" Rods held between Spring Clips in the arms of two Double Angle Strips bolted to the front of the base. Two lengths of Cord are attached to the outer ends of the span and they are passed several times around the winding drum 5 after being guided between two 1½" Rods fitted to the platform. The Cords are then tied to Obtuse Angle Brackets on the counterweight.

Parts required to build model Lift Bridge: 10 of No. 1; 14 of No. 2; 2 of No. 3; 10 of No. 5; 2 of No. 6a; 4 of No. 8; 4 of No. 10; 2 of No. 11; 12 of No. 12; 2 of No. 12a; 2 of No. 15; 1 of No. 15a; 1 of No. 16; 4 of No. 18s; 1 of No. 18b; 5 of No. 22; 2 of No. 22a; 1 of No. 23; 1 of No. 24; 14 of No. 35; 91 of No. 37a; 85 of No. 37b; 13 of No. 38; 1 of No. 40; 4 of No. 48a; 1 of No. 52; 2 of No. 54a; 1 of No. 80c; 2 of No. 90a; 4 of No. 111c; 4 of No. 125; 2 of No. 126; 1 of No. 176; 1 of No. 186; 1 of No. 186a; 4 of No. 188; 4 of No. 189; 4 of No. 190; 2 of No. 191; 4 of No. 192; 1 of No. 198; 1 of No. 213; 1 of No. 216; 1 of No. 217a; 1 No. 1a Clockwork Motor (not in Outfit).

Meccano Model-Building Competitions

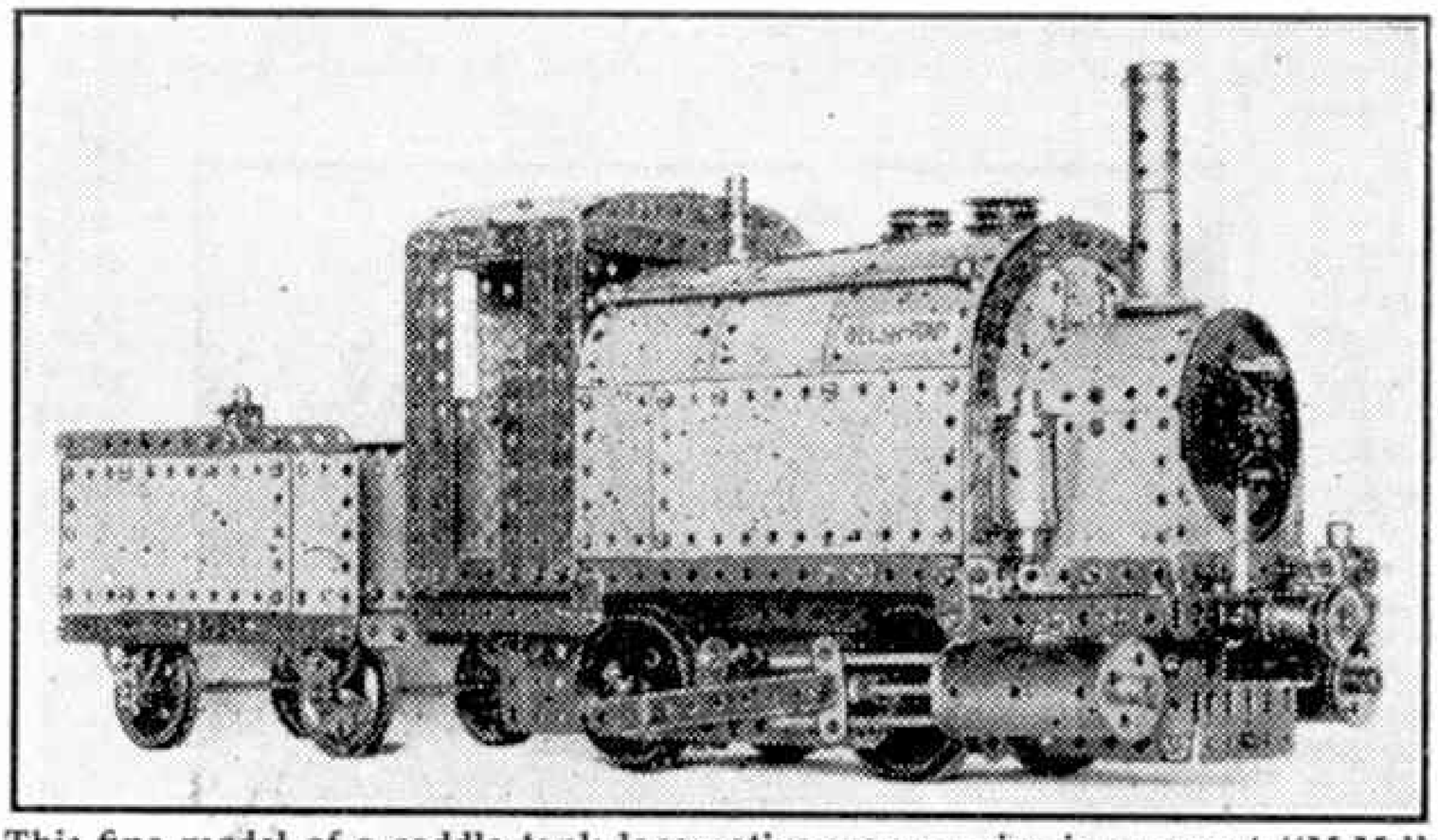
By "Spanner"

A Contest All Readers Can Enter

There is still time to plan and build a model for entry in the general contest announced in last month's *"M.M."* Any kind of structure or machine may form the subject for an entry in this competition, and every reader can and should build a model that is suitable for it. Large models are not specially called for, and in making their award the judges will take the interest and originality of entries into consideration as well as skill and workmanship in construction.

Entries in the competition will be grouped in two sections, one for competitors over 15 years of age and the other for those aged 15 or under. Actual models must not be sent; all that is needed is a good photograph or drawing, with any notes that may be necessary to make everything clear. Competitors must not forget to write their names, ages and addresses on their entries and on the backs of each photograph or drawing accompanying them.

In each section prizes of £2/2/–, £1/1/– and 10/6 respectively will be awarded and there will be consolation prizes of 5/– each for good entries that do not win any of the principal prizes. Entries must be addressed *"September Model-building Competition, Meccano Magazine, Binns Road, Liverpool 13,"* and the closing date is 31st October.



This fine model of a saddle-tank locomotive won a prize in a recent "M.M." model-building contest for P. R. Wickham, Leicester.

"Special Parts" Contest Results

The novel "Special Parts" Contest announced in the June and July 1942 issues of the *"M.M."* proved very popular. The variety of subjects that were among the entries, and the remarkably realistic but simple models submitted, showed that model-builders revelled in the opportunity that the contest offered for showing skill and ingenuity in making use of the limited range of Meccano parts allowed in it. The results are as follows:

First Prize, Cheque for £2/2/–: P. R. Wickham, Leicester; 2nd, Cheque for £1/1/–: N. C. Ta'Bois, Woodford Green; 3rd, Postal Order for 10/6: C. Wrayford, Bovey Tracey.

Consolation Prizes of Postal Orders for 5/–: G. Crowther, Retford; A. Grant, Aberdeen; F. Hobart, Leighton Buzzard; B. Williams, Sandown; G. Heywood, Royton.

The working model sack-stacking machine built by P. R. Wickham, Leicester, that was awarded First Prize, reproduces all the movements of its prototype. The chassis of this model is mounted on two travelling wheels and two castors and supports the conveyor, which consists of Strips spaced apart at one end by a Chimney Adaptor and at the other by a ½" Pulley, which form the drums around which passes the conveyor belt. The belt consists of a band of paper, which is driven by turning a crank handle. A Collar mounted on the shaft of the handle has a small piece of gummed paper wrapped round it, and this makes contact with the belt. The outer arm of the conveyor can be set at any angle by adjusting a Cranked Curved Strip that is connected to it by a ½" Reversed Angle Bracket and which is pivoted to the chassis at its lower end. A drawbar provided for the transporting of the machine consists of a short Rod held in an End Bearing bolted to the chassis.

The Second Prize was awarded to N. C. Ta'Bois, Woodford Green, for a realistic model "talkie" projector of the type used in cinemas at the present time. The lamphouse is represented by two Flat Trunnions bolted to a Double Bracket attached by a 1⅛" Bolt to the gate and projection lens, which are formed from two Flat Brackets spaced apart and fitted to a Coupling. A shutter is provided by a ¾" Disc that is attached to the model by a ½" × ½" Angle Bracket. The film reels are 1" loose Pulleys attached to the outer ends of two 2½" Strips, the inner ends of which are bolted to the framework of the model. This is built up from a 5½" Strip fixed to the base and braced by a 3" Cranked Curved Strip. The driving motor is neatly represented by a Chimney Adaptor.

A fine model of a pair of scales earned the Third Prize in this contest for C. E. Wrayford, Bovey Tracey. The beam is formed from a 3" Cranked Curved Strip, attached at its outer ends to 1½" Strips from which are suspended the scale pans, and is free to pivot on a Bolt inserted in two Flat Brackets. The Flat Brackets are mounted on a 1⅛" Bolt attached by means of an End Bearing to a Rod that is free to slide in the centre pillar of the scales.

Club and Branch News

WITH THE SECRETARY

MAKING A NEW START

Clubs and Branches plunge this month into the indoor programme with renewed enthusiasm. The prospects are excellent. Clubs that have found difficulty in holding meetings during recent winters are re-starting, and have found ways and means of overcoming their difficulties, or at least of making the best of wartime conditions. New members are being eagerly sought among younger boys, and enthusiasts who wish to join in the movement should write to me for details of Clubs in their neighbourhood.

What is chiefly required for the success of each Club or Branch is a really bright programme, full of variety, with model-building and games contests to make it exciting and attractive, especially to new members. There must be nothing lukewarm about proceedings generally, for Meccano boys cannot be expected to show eagerness to belong to a Club that is run on slack lines.

GUILD AND H.R.C. BADGES

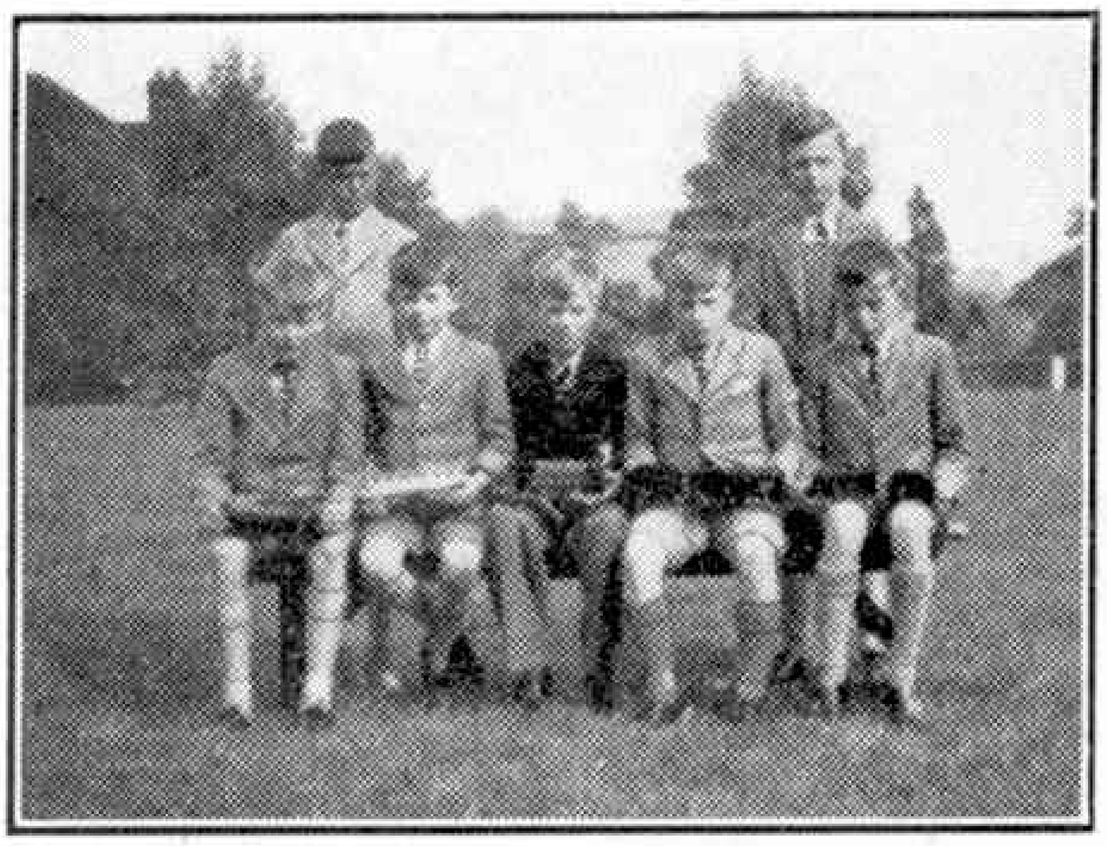
Owing to Government restrictions it is now impossible to obtain more Guild or H.R.C. badges. The Hornby Railway Company is affected immediately, and H.R.C. badges are not now available. Applicants who are owners of Hornby or Hornby-Dublo Trains will continue to be enrolled, and certificates will be issued; but as badges cannot be supplied, entry will now be free. Application forms must be sent in as usual, but without the remittance of 6d. to pay for the badge, and I will gladly send forms to all who write to me for them. The issue of badges will be resumed as soon as they can be obtained.

The Guild is not affected at present by this change. Badges are still available, but when the present supply is exhausted no more will be available until war conditions relax. All who are eligible for Guild membership therefore should send in application forms at once, to ensure the receipt of the badge.

FOR OVERSEAS APPLICANTS

A recent order prohibits the export of both Guild and H.R.C. badges. Our agents in Canada, Australia, New Zealand and South Africa respectively, have small supplies, and applicants in those countries should forward their forms to them. When these supplies are exhausted owners of Meccano Outfits and Hornby and Hornby-Dublo Train Sets will be enrolled free on receipt of the usual application forms, and they will receive certificates and be entitled to all Guild and H.R.C. privileges. This will apply immediately to all other overseas applicants.

The addresses of the agents referred to above are as follows: CANADA: Meccano Ltd., 187–9, Church Street, Toronto. AUSTRALIA: E. G. Page and Co., 52, Clarence Street, Sydney, N.S.W. NEW ZEALAND: Models Ltd., Robertson Building (2nd Floor), 53, Fort Street, Auckland, C.1. SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), 142, Market Street, Johannesburg.



A group of members of the Beech Hall (Macclesfield) Branch, which operates both an electric and a clockwork layout. A goods yard is included, and is the scene of great activity. The Chairman of the Branch is Mr. J. D. M. Hunt, and the secretary J. Cheetham.

Branches Recently Incorporated

427. MOSSLEY HILL—Mr. G. Livingston, 20, Taliesin Street, Liverpool 5.
428. COCKFIELD—Mr. A. J. Sharing, Station House, Cockfield Fell, Co. Durham.
430. SALE—Mr. E. Blackhurst, 21, Brookside Road, Brooklands, Cheshire.

Branch News

WEST WICKHAM.—A new track has been laid down and extended at successful meetings. Running operations have been carried out regularly, and shunting practice has been given. Railway Knowledge Tests are popular with members. Scenery also has been constructed and signalling practice enjoyed. One meeting each week is devoted to track work and a second to Cycle Runs, Competitions, etc. *Secretary:* A. Edmeads, 67, Silver Lane, West Wickham, Kent.

NEW ZEALAND

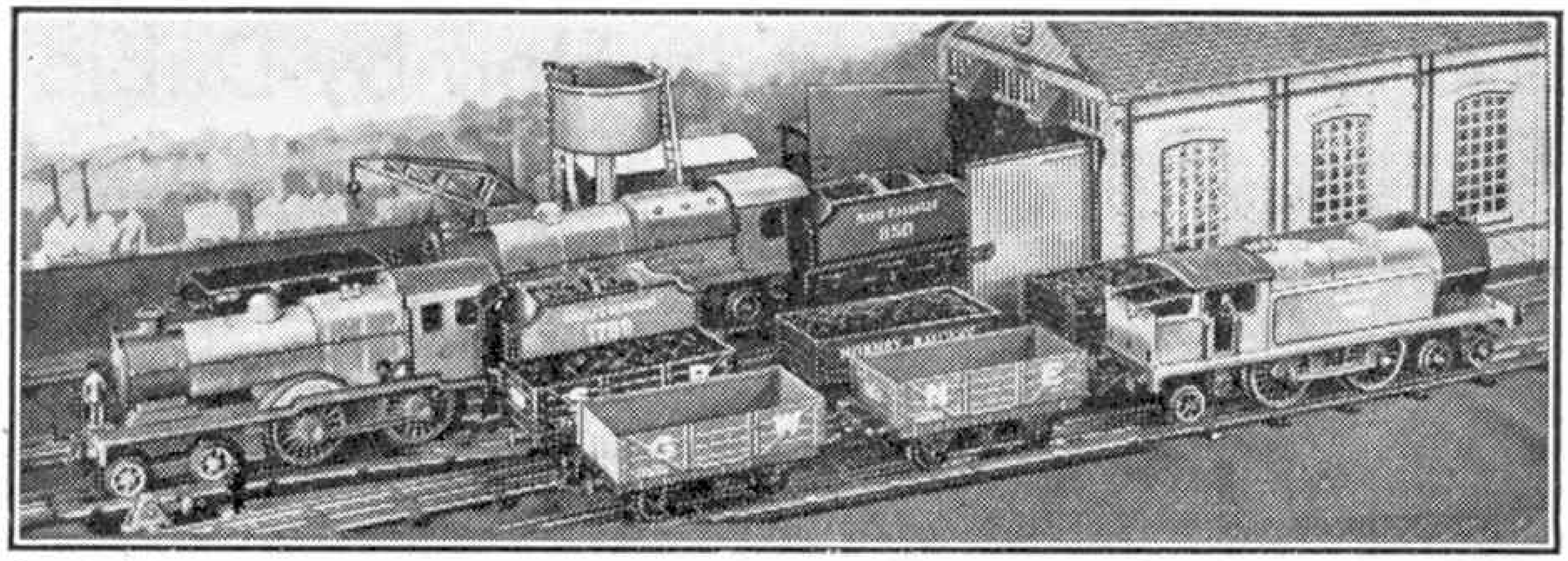
MT. ALBERT (AUCKLAND).—Both indoor and outdoor track meetings have been held regularly. The Branch now occupies a garage, where a fine track has been laid down, and members are keen and enthusiastic. An interesting Visit was paid to Auckland Railway Station. *Secretary:* M. Bird, 2, Exter Road, Mt. Albert, Auckland, New Zealand.

WELLINGTON WEST.—Work on the Branch Railway has continued steadily, and special attention is now being given to scenery. Younger members are given special encouragement, and are doing excellent work in place of older members called up. The Branch is now in charge of Mr. C. Freeman. *Chairman:* Mr. T. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington, New Zealand.

Club Notes

ACTON M.C.—The new Club miniature railway is to be of Gauge 00, and is to represent a G.W.R. section. A railway "Quiz" has been held, and track discussion meetings have been arranged in order to decide upon the form of the new Club layout. Club roll: 14. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

TOTNES M.C.—The 1942 outdoor programme ended with cricket practice and matches, and a tracking meeting in which "Nuts" and "Bolts" competed against each other. Model-building and aircraft identification are regular programme features. Club roll: 13. *Secretary:* P. Pascall, The Gables, Totnes.



A typical locomotive depot on a Hornby Railway. The material includes loaded and empty coal wagons, also a breakdown train.

Overhauling Your Hornby Railway

AT this time of the year the Hornby railway owner usually turns his attention to examining and overhauling his equipment to make sure that everything will be in good trim for the busy months ahead. In this article we give a few hints on this process for the special benefit of younger readers.

The first item to require attention is the track. Even on permanent layouts it is wise to go over the rails and points, testing their truth to gauge by means of the combined Screwdriver Spanner and Rail Gauge. If the layout is a portable one, where the rails are put down and taken up again when operations are over, it is well to look at the rail ends. With tinplate rails there is a tendency for the hollow rail ends to become opened out as a result of use. This can be corrected by means of a small pair of pliers; in order to prevent the rail head from being pinched up too tightly a spare rail pin or a nail of the correct size should be slipped into the rail head while the pliers draw the sides of the web or flat portion of the rail together.

Each length of Rail must have the correct number of rail connecting pins and these should be tight.

With Steel Track the fishplates should be examined, and any that have been opened out should be removed from the rail ends, pinched up with pliers and replaced on the rails.

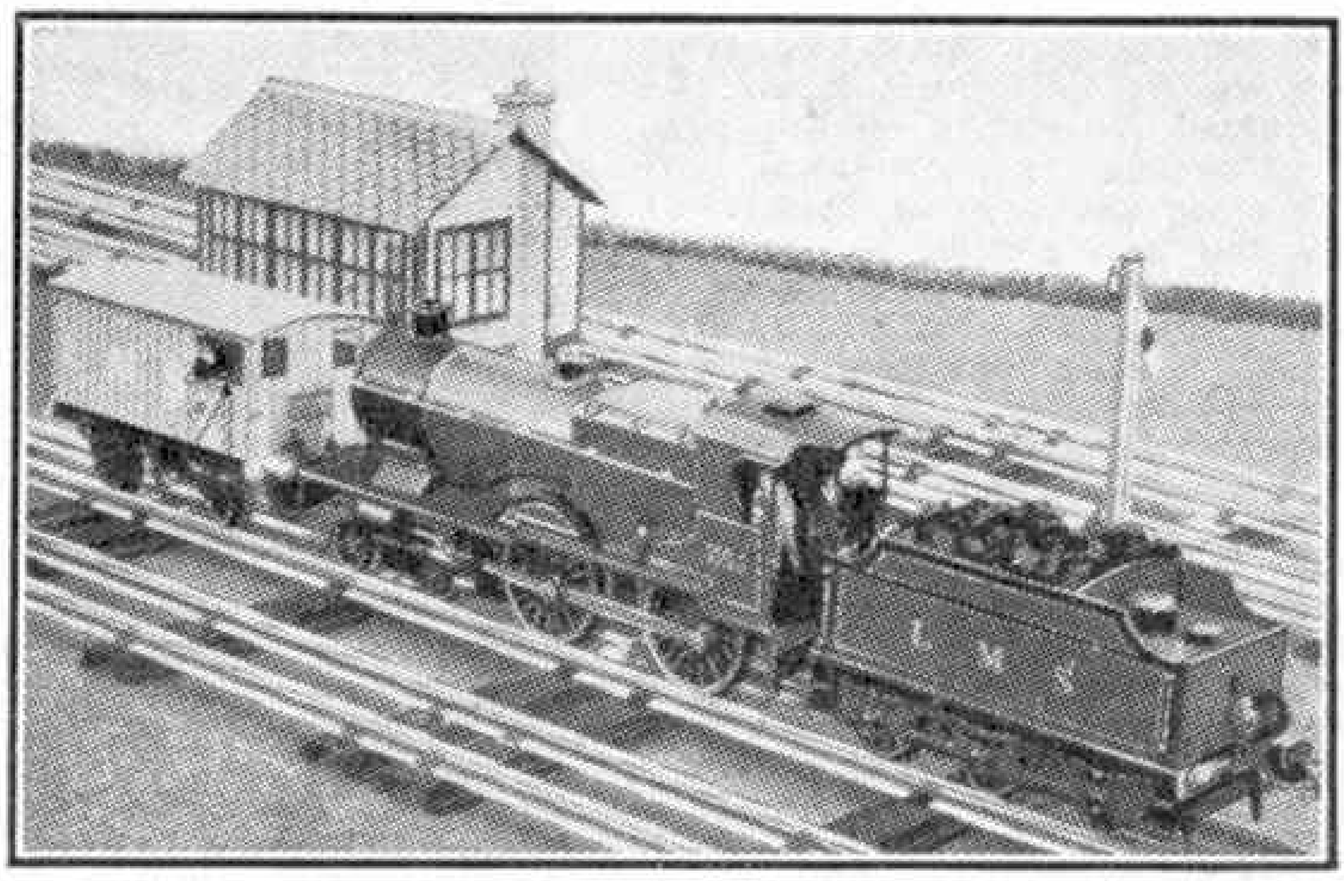
With all track the Points should be looked over with special care to ensure that the moving parts such as the switch rails and operating levers are in order. Slight adjustments to the "toe" or sharp end of the switch rails may be necessary so that these lie up close to the fixed or stock rails in either position of the operating lever. With Tinplate Points the alignment of the switch rails at the trailing end of the Points also should be checked.

The rail heads may be oily or may have a black muddy-looking deposit on them. If they are only slightly oily they can be wiped clean with a dry rag; where the deposit is thick a rag with the slightest trace of petrol is the best thing to use, and this work must be done in the open, well away from any fire or flames. Paraffin is of little use for the job as it always seems to leave a greasy film on the rails. Similar treatment should be employed for cleaning the wheel treads of all engines, tenders and rolling stock.

Where Hornby Electric Locomotives are in use, the details given in the instruction leaflets are usually sufficient to guide the owner. Working parts should be clean, and where these cannot be reached effectively with a rag, a paint brush of the ordinary small type can be pressed into use, moistened with a drop of petrol. At the same time the different nuts and the few bolts here and there about the engine can be tried to see that they are tight.

The mechanisms of model clockwork locomotives are apt to become dirty after a period. They require a certain amount of oil, but there is a tendency among miniature "loco-men" to overdo things. This invariably attracts dirt, and if not removed fairly often this has a clogging effect on the motor. The petrol brush can be used here also, the wheels of the mechanisms being turned from time to time while the work is in progress, so that all parts of the gears are dealt with. When the mechanism is clean and dry the various spindles, axles and gears should be very lightly oiled with thin machine oil, or peferably Meccano Lubricating Oil.

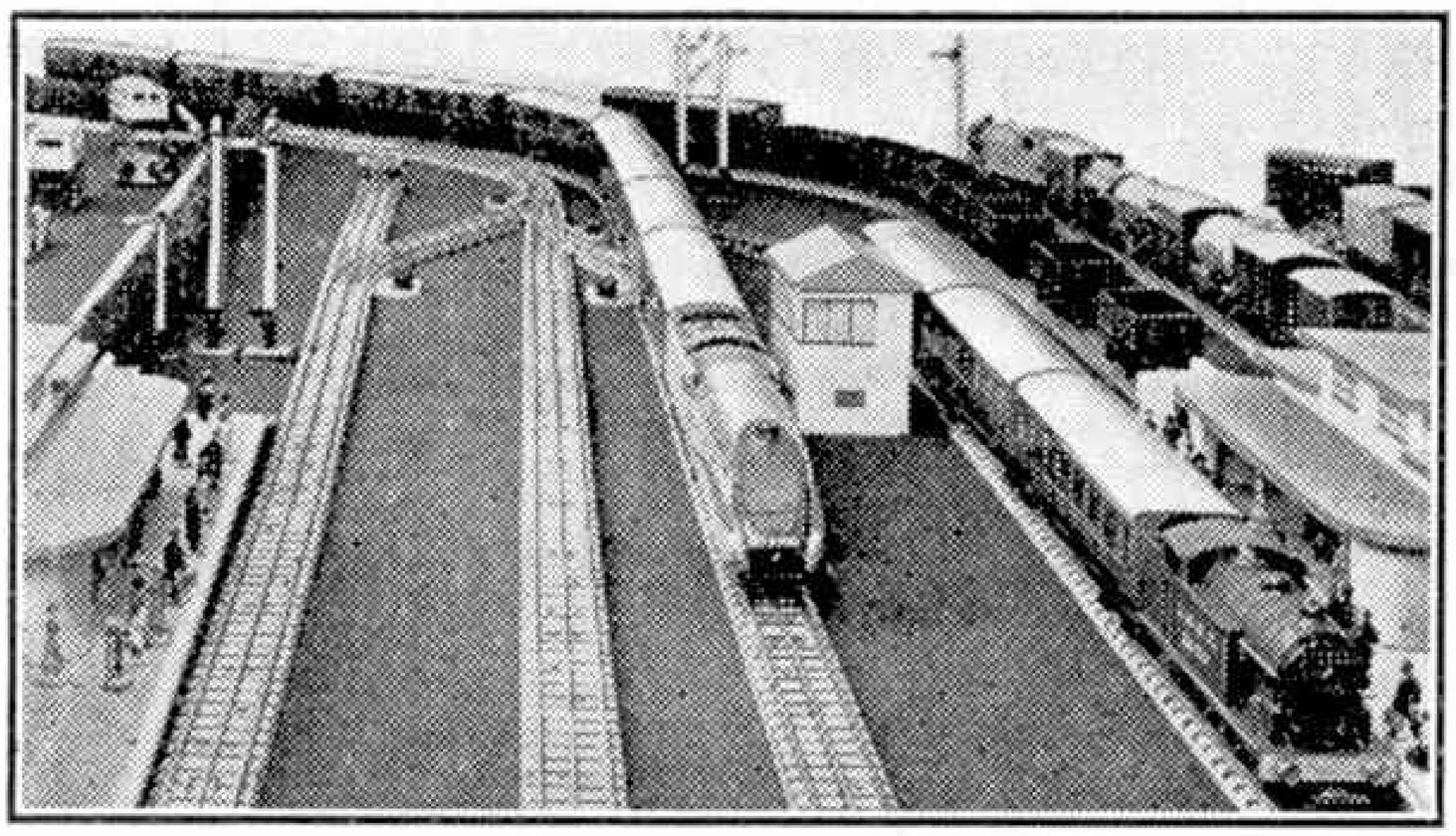
Tender wheel frames, bogies, and the trunnions or axle guards of wagons and rolling stock should be examined to make sure that none of the wheels are being "pinched" and so prevented from turning freely. At the same time bearings should be cleaned, and where axle-boxes are fitted they should be given fresh lubricant, either oil or Meccano Graphite Grease.



A Hornby L.M.S. Standard Compound and Brake Van. They are proceeding down the line to pick up a freight train.

L.N.E.R. Operations in Hornby-Dublo

IT is some time now since we dealt with the reproduction of particular "East Coast" main line operations of the L.N.E.R., so that readers who are fortunate enough to possess a Hornby-Dublo Streamlined Train Set may welcome a few ideas based on L.N.E.R. practice.



An important Main Line Station. A local train is at one platform while a heavy express speeds through.

Considering first the components of the Dublo Passenger Train Set, we have the Two-Coach Articulated Unit, the design of which is based on the standard L.N.E.R. vehicles for long-distance running. It can be made therefore to represent practically any of the important L.N.E.R. expresses, except those for which special stock was in use, such as the high-speed "*Coronation*." We can, however, run such old favourites as "*The Flying Scotsman*," which attained its eightieth birthday last June. The Two-Coach Unit and the separate Corridor Coach together make up the standard "set" used by the L.N.E.R. in the assembly of their trains.

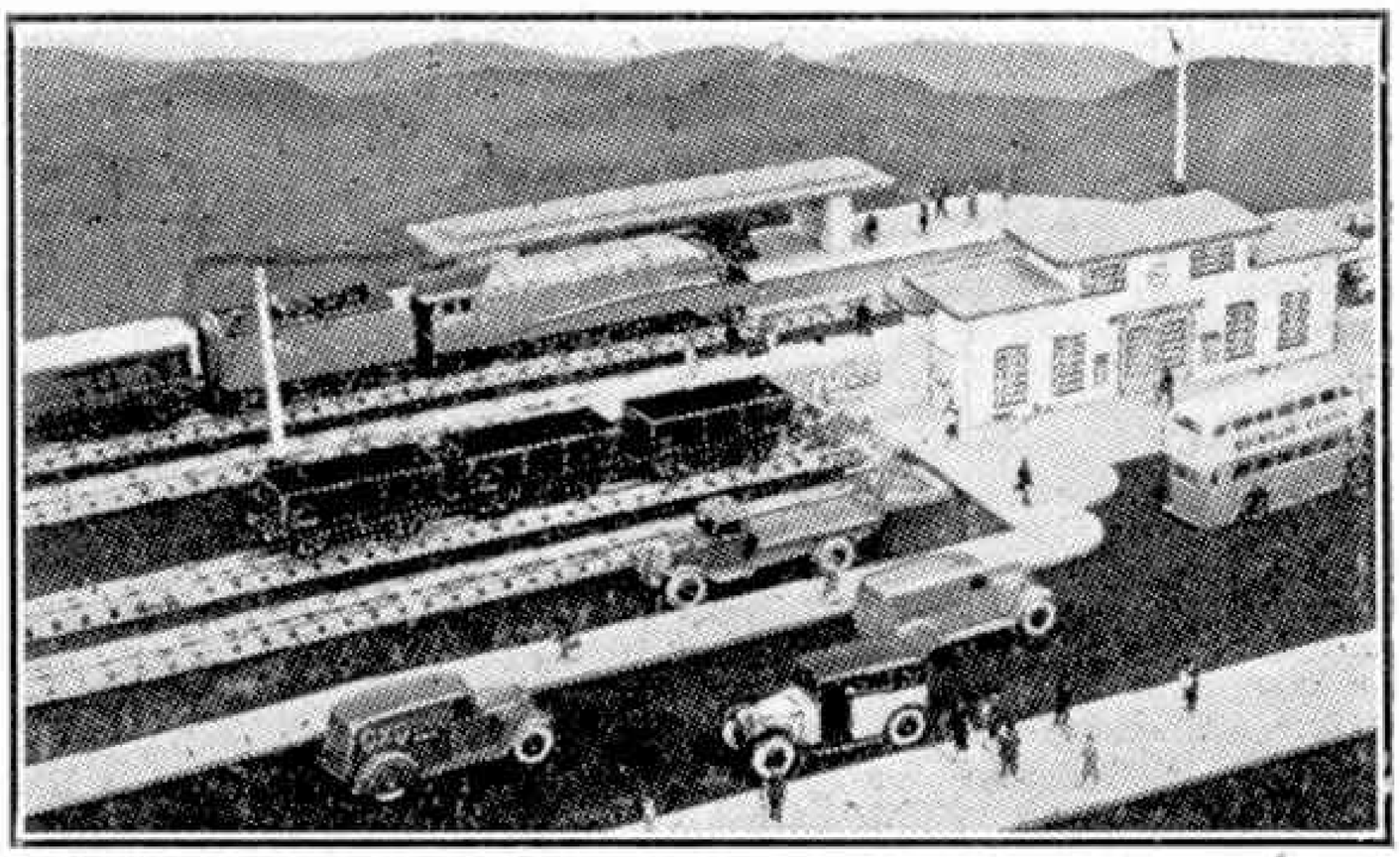
Normally this three-coach set makes a train of convenient length for the station platforms on most Hornby-Dublo systems. If we have sufficient stock, however, we may wish to run longer trains than usual to represent the giant formations that are regularly assembled these days on the East Coast Route. In the upper illustration on this page an extra-long express is shown passing along the inner or "fast" line of a four-track section.

The illustration just referred to also shows another use for Dublo Coaches. They can be employed very well for local traffic, for articulated units are commonly employed on this work on the L.N.E.R. The fact that the miniature vehicles are of corridor type does not matter because main line coaches are often made use of for a suburban run in between longer-distance turns of duty. A Two-Coach Unit forms a train of convenient size when platform length and the necessity for running the engine round its train at terminal points are considered. For "busy periods" or imaginary "rush hour traffic" the Unit can be strengthened by the addition of the separate Coach D1.

As regards the journeys supposed to be made by our trains, much depends on the particular services in which we are interested. In the June issue this year on page 225 we gave some details for the operation of through services between King's Cross and Aberdeen, stage by stage over practically the whole length of the East Coast Route. Engine-changing operations were a feature, thus dividing the work between different operators; but one boy with one engine could have plenty of fun by working his locomotive away from the train at a changing point, and working it on again as if it were a fresh locomotive for the next stage of the journey.

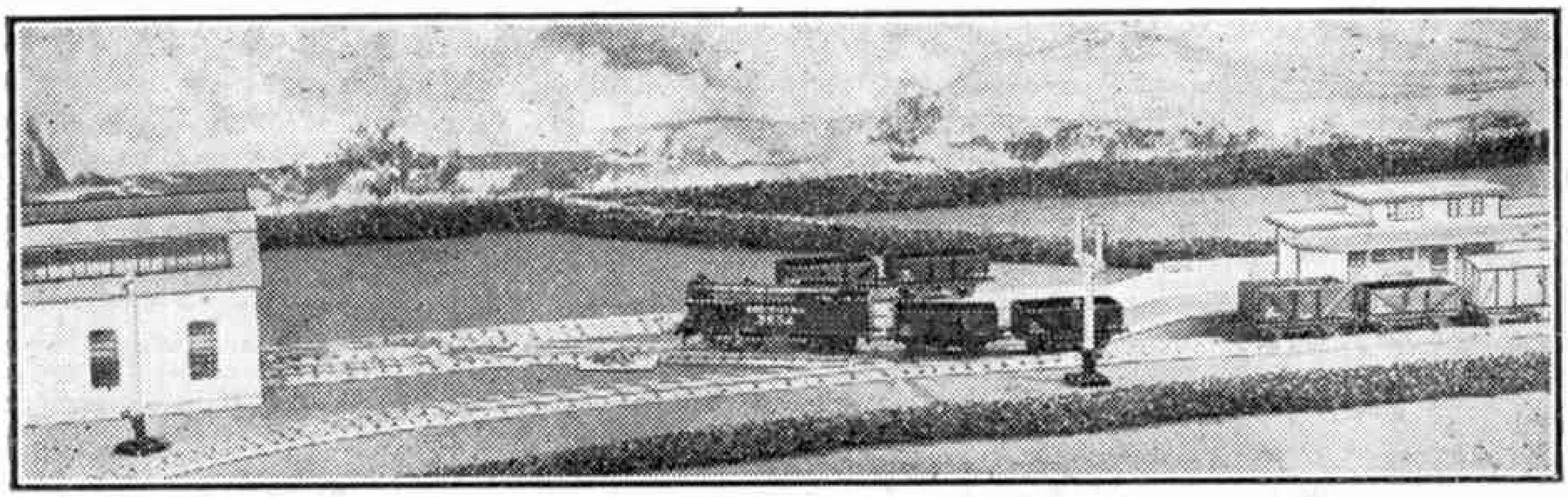
In a similar way a "lone hand" could make himself quite busy in reproducing, say, one of the West Riding services for Leeds and Bradford from King's Cross. The train might consist of a Twin Unit and a separate Coach D1, the latter being in the rear. The twin unit would represent the main portion of the train destined for "*Leeds*"; on arrival at that station, which is a terminus, the separate coach representing the portion for "*Bradford*" would be uncoupled and taken away to its destination by another engine. In the reverse direction the coach would be worked in and attached to the main train before it sets off on its run. The carrying out of working of this kind will be found most fascinating, especially in the engine and vehicle movements necessary in order to assemble the train in the correct formation and so on.

In the matter of motive power the East Coast enthusiast is well catered for in the Hornby-Dublo system. The locomotive in the Dublo Passenger Train Set with which we began operations is a splendid reproduction of the 4–6–2 "A4" streamliner "*Sir Nigel Gresley*," one of the best known members of a numerous class that have added to their reputation for speed a great name for the haulage of colossal loads as a result of war conditions. The Dublo "Pacific" will be found no less willing to tackle a good train either of passenger or freight stock.



A wayside station with effective sidings and road approach. Note the use of Dinky Toys components to increase the realistic effect.

The standard Dublo Tank Locomotive is even more adaptable. The L.N.E.R. model very closely resembles the real "N2" class that are familiar on all the London suburban workings, and are of course found elsewhere in the system.



A corner of the layout as it would look if arranged as suggested in this article.

A Reader's Dublo Layout Scheme

OUR Dublo layout this month is based on the plan of a system at present under construction by one of our readers, D. F. Felton of Birmingham. Before dealing with the actual system as far as it has progressed up to the moment of writing, we will consider the plan itself together with its operating possibilities. Actually our diagram includes a slight development on the original plan received from our reader, with the idea of increasing the operating interest and fun.

As the diagram shows, the plan consists of an oval main line of single track. Inside the oval from the lower straight side there is taken off a branch line. This soon branches into two lines, each serving a platform of a central terminal station. The terminus is named "*Westfield*" on the diagram, as this is the title selected for the actual station on the system in question. Near to the points on the main line where the terminal branch is thrown off there is a "halt" or small station known as "*Knobberly Halt.*" By the upper end of this in the diagram there is an overbridge that carries the roadway across the centre of the layout to "*Westfield.*" Further round still we come to "*Ashford,*" a station of the normal wayside type.

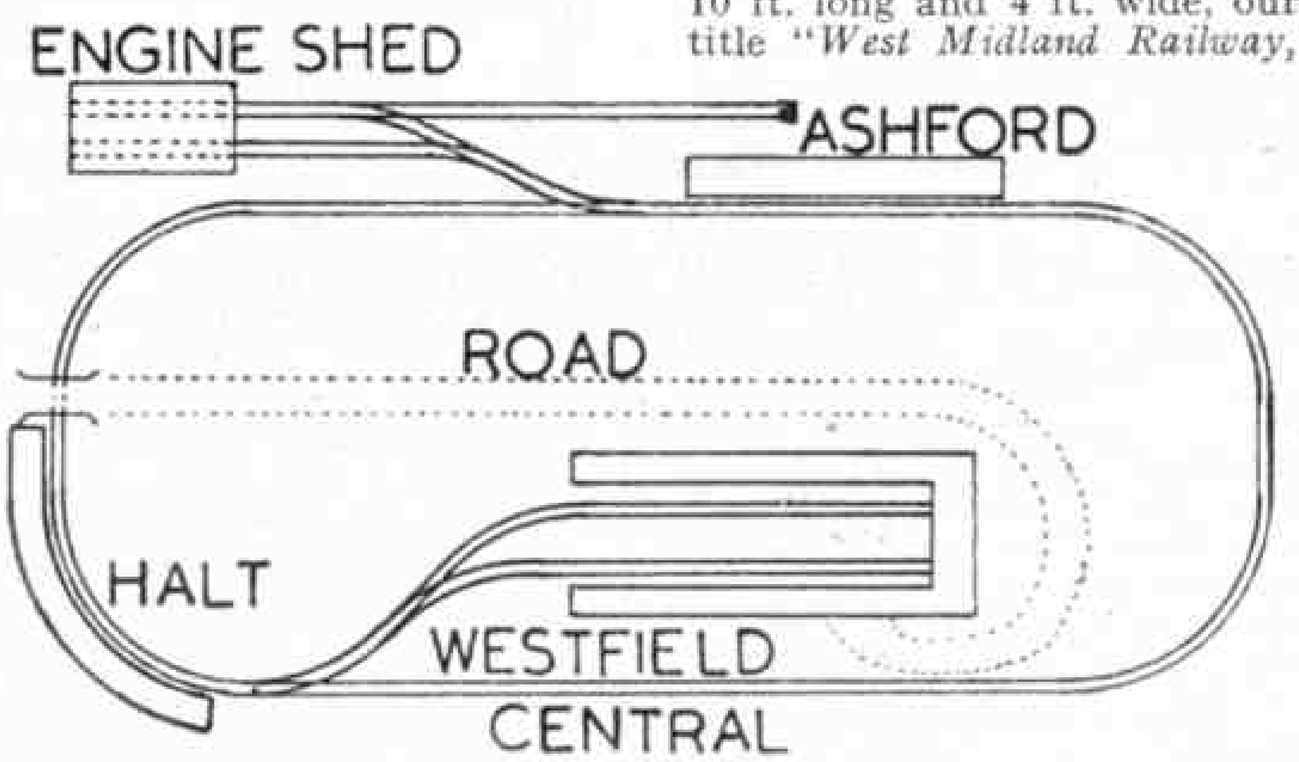


Diagram of the layout referred to on this page.

At "*Ashford*" is situated a locomotive shed, which is reached from the main line by means of the connections shown. In the original plan a single line only led into the shed. Our diagram, however, shows an additional track in the shed, and the extension of this beyond the crossover points connecting the shed tracks forms a siding that runs behind "*Ashford*" station platform. This is the arrangement shown in the illustration on this page, which indicates how the corner of the system could be made to look if laid out according to the diagram.

One advantage of the additional shed track is that it provides more accommodation for locomotives in case the present "stud" is increased. On the other hand it can be used for coal wagons for supplying "loco coal"; and the extension of the track towards the station can be used for empty wagons or those supposedly used for the removal of locomotive ashes and other material from the shed. Another possibility is that, by making use of the shed track general goods wagons can be shunted in and out of the siding, thus dealing with goods traffic handled at "*Ashford.*" There is no goods depot there, but Dinky Toys motor vehicles can be backed up to the railway wagons in the siding in order to deal with the freight.

Trains can be run from "*Westfield*" on to the main line to serve both "*Knobberley Halt*" and "*Ashford.*" As many circuits of the main track as required by the working arrangements can be made, and the journey can be ended at either of these stations. For the return trip to the terminus the same engine can be run round "light" to the other end of the train. Alternatively, if another engine is available in the shed it can be worked out to the train and the first engine returned to the shed. Then the return journey to "*Westfield*" can be made.

For his system, which is being laid on a baseboard 10 ft. long and 4 ft. wide, our reader has chosen the title "*West Midland Railway,*" a name taken from railway history from a line now forming part of the G.W.R. that originally connected Oxford, Worcester and Wolverhampton. The present system, however, is quite an independent concern, for although it is worked at the moment by S.R. components from the Hornby-Dublo Clockwork Goods Train Set, it is proposed to repaint and reletter the engine and vehicles in "*West Midland*" colours and style.

The track is being laid with miniature permanent way materials, steel rails with separate chairs and sleepers intended specially for 00 gauge railways; but those who wish to reproduce the layout in Hornby-Dublo rails will find no difficulty in doing so. At the moment of writing "*Ashford*" station is complete and installed and "*Knobberley Halt*" is under construction. "*Westfield*" is to be in town surroundings, and it is proposed to run a miniature tramway system from the overbridge along the roadway to the terminus.

The roadway offers a great deal of scope for realistic road traffic effects. Motor bus and tramcar services will be introduced, and various kinds of motor vehicles could be put to good use in the neighbourhood of each of the stations.

We shall look forward to further news of the "*West Midland*" system.

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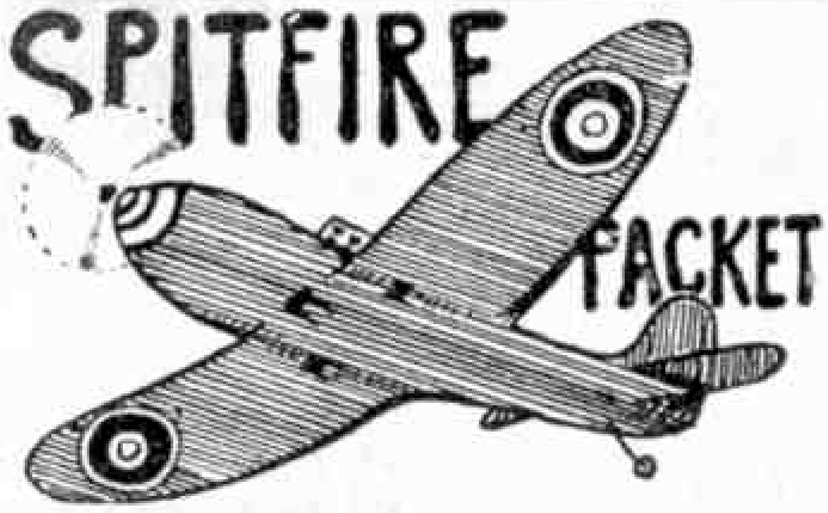

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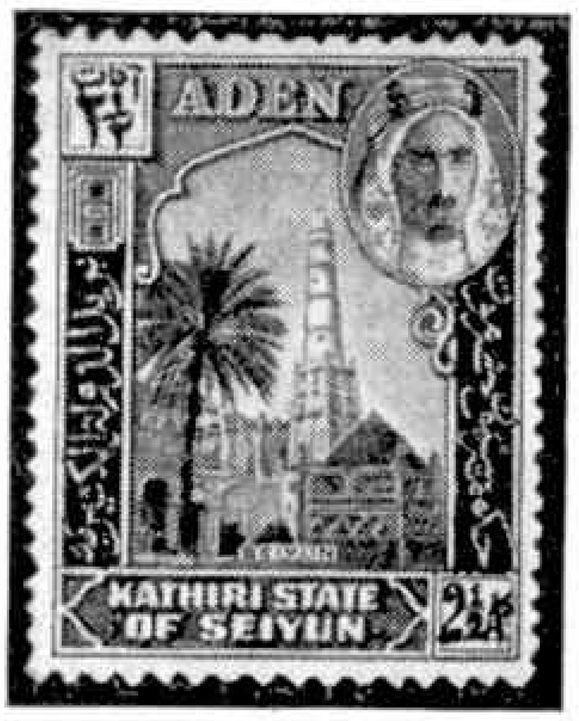
Stamp Collecting

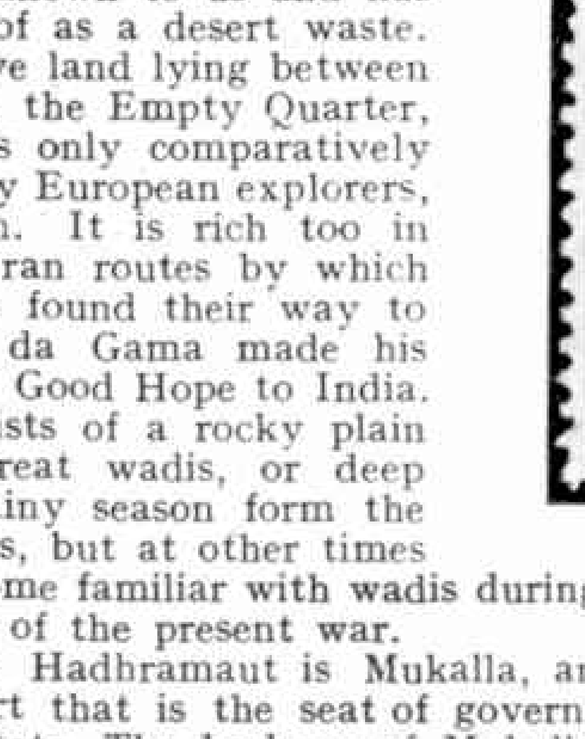
New Stamps from Arabia

THE appearance of a fine new set of pictorial stamps is always an attractive event, and our interest is deepened when such sets appear from States that are new to the stamp world, a very rare event nowadays. Because of this the stamps that have been issued in the Qu'aiti State of Shihr and Mukalla and in the Kathiri State of Seiyun respectively are worth more consideration than we were able to give them in our announcement last month of their appearance. These two countries are in Arabia, in the part of the Aden Protectorate that is known as the Hadhramaut. The stamps of Aden have been current in them since their first issue in 1937, and are to be found with the post marks of Mukalla, Shihr and Seiyun respectively. The new stamps also will be valid throughout the Aden Postal Union. Mukalla was depicted on two stamps of the Aden series of 1939.



The Hadhramaut is east of Aden, in a country that is little known to us and has usually been thought of as a desert waste. It is really a productive land lying between the great Rub al Kali, the Empty Quarter, a vast desert that has only comparatively recently been crossed by European explorers, and the Indian Ocean. It is rich too in history, for across it ran routes by which the spices of the East found their way to Europe before Vasco da Gama made his way round the Cape of Good Hope to India. In large parts it consists of a rocky plain through which run great wadis, or deep valleys that in the rainy season form the beds of torrential rivers, but at other times are dry. We have become familiar with wadis during the African campaigns of the present war.

The gateway of the Hadhramaut is Mukalla, an ancient Arabian seaport that is the seat of government of the Qu'aiti State. The harbour of Mukalla is shown on the carmine 1½a. value of the Shihr and Mukalla series, and the former palace of the Sultan, now used as a Government building, is seen in the centre of the picture. Mukalla is described by one traveller as a clean and pleasant town. On its eastern side a mountain barrier almost reaches the sea, and on the landward side it is protected by steep cliffs, on which are many forts and watch towers that defended the city from marauders of earlier days. One of these forts, the Outpost of Mukalla, is pictured on the 3a. stamp, printed in sepia and carmine. Shihr, the second of the two cities giving their names to the Qu'aiti State, is an important commercial centre farther along the coast from Aden than Mukalla. In the new issue it is represented on the sepia 2a. stamp, which shows a typical Hadhramaut gate, with white-washed buildings on each side of it.



The cities of the Hadhramaut, especially those of the interior, are startling in appearance, for their builders seem to have anticipated the Americans in the building of skyscrapers. Shibam, the capital of an inland province of the Qu'aiti State, is an excellent example of this, as will be realised from the design of the blue 2½a. stamp, reproduced on this page. Not only are its buildings very tall, but they are crowded closely together, and the appearance of height is increased by the characteristic use of small upper windows on the higher floors, which to Westerners suggest that the buildings have twice as many storeys as there really are. The lower storeys are windowless, and there are no chimneys.

It is the want of space in the wadis in which they are built that has led to the erection of tall buildings. The 500 houses of Shibam are clustered on a low rise out of reach of floods, which pour down the wadi in a torrent in the spring. They are of mud bricks, the characteristic building material of the country, made by mixing mud with straw stubble and leaving them in the sun to dry. This somewhat primitive method reminds us of the brickmaking of the Israelites in Egypt during their captivity. The strain on the bricks is relieved to some extent by building walls that slope inward, a practice that is followed all over the Hadhramaut, but is specially noteworthy in the "leaning houses" of Shibam, shown on the 2½a. stamp. One result is to give the closely packed clusters of building the appearance of a fortress. The walls are usually whitewashed, so that one traveller has described the city as looking like "a large round cake with sugar on it."

The people of the Hadhramaut are devout Moslems of the Seyyid sect, claiming descent from Ali, who married the daughter of the Prophet Mahomet and was assassinated by rivals; and one of the Qu'aiti stamps, the orange 8a, gives a view of 'Einat, a sacred city and sanctuary. Another interesting feature of this stamp is that it illustrates the stepped pyramid design, with an arrowhead effect at the top, that is characteristic of so many Hadhramaut buildings, doorways and windows. The stepped pyramid design is ancient in origin, for it was used in Babylonia thousands of years ago, but the arrowhead apex is peculiar to the Hadhramaut.

Other sacred cities featured in the designs of the Qu'aiti issue are Meshed, to which pilgrims come from many distant parts of Arabia, and Hureidha. A view of Meshed provides the design of the brown and green 5r. stamp, the city's cistern being shown in the foreground, and a mosque in Hureidha during an Arabian religious feast is (*Continued on page 373*)

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The little islands of St. Pierre and Miquelon, recently taken by the Fighting French, have now issued stamps with a fine ship design. I offer a set of these absolutely free to all applicants for approvals enclosing 2½d. postage.

R. D. HARRISON - ROYDON - WARE

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YOU OUGHT to write immediately for this wonderful Packet. **WE** will send it to you **ABSOLUTELY FREE.** It contains the newly issued and very attractive stamp of **ZANZIBAR**, a country whose stamps are scarce and difficult to get. Other stamps, fine and interesting stamps, are also included in this **FREE PACKET**; we will not tell you now what they are, but leave it for you to discover for yourself as a lovely surprise when you receive your packet. A word of **WARNING. DO NOT** put off sending for this **FREE PACKET** until it is too late and we are sold out. Then, you will have to look in your friend's collection to see what could easily have been in yours. **ALL** sensible collectors will **WRITE US NOW.** All you do to get it is: 1.—Write clearly your name and full address. 2.—Ask for Zanzibar Free Packet. 3.—Ask for Approvals. 4.—Enclose 3d. in stamps to cover our posting expenses; and 5.—Post your application to:

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Having received large consignment of **British Colonial Pictorials**, I now offer **every reader** of "Meccano Magazine" sending 3d. postage, asking for Globe-Trotter "Little Black" Approval Books, **absolutely Free**, set of **3 Large Mint Brit. Col. Picts.** Furthermore, **the first 500 applicants** will receive additional attractive stamps. **Don't delay—Post Now!**

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Philip J. Dyke, 35, Buckleigh Ave., Merton Park, S.W.20

Stamp Gossip

and Notes on New Issues

Victory "V" Stamps

Costa Rica has issued a large "Victory" stamp, of value 5c. It is inscribed "*Defensa Continental*," which means simply "*Continental Defence.*" It is distinguished chiefly by a large letter "V" enclosing the Torch of Victory, and the banner of Costa Rica and the massed flags of 21 American States are also included in the design.

Stamps in which the Victory "V" figures have been issued also in the Belgian Congo. The "V" is carried in a shield over which stands a lion rampant, and at the bottom of the stamp is the inscription "*Belgium shall rise again*" in French and Flemish. Two stamps of this design, ultramarine and emerald green in colour respectively, have been issued in the Congo itself, and two others in light blue and brown-red come from Ruanda and Urundi, Belgian mandated territory on the eastern border of the Congo. All four stamps are of the value 10f., and carry the remarkably high surtax of 40f., the proceeds of which are for the War Relief Fund.

The 1943 Whitfield King Catalogue

The 42nd edition of this standard catalogue shows changes from its predecessors as a result of war conditions. Future editions will appear in two volumes, for British Empire and foreign stamps respectively, and for 1943 only the British Empire section is issued, with a supplement giving details of foreign new issues and an extensive list of price alterations.

The catalogue is compact and handy, and is particularly suitable for young collectors, since it ignores minor differences of perforation and shade. The total number of stamps recorded in the British Empire section, including those of Egypt and Iraq, is 16,032, and of these Asia with 5,104 stamps and Africa with 4,178 provide considerably more than half. Europe contributes 1,057. The number of illustrations in this section alone is 1,855, and altogether there are 1873.

The price of the catalogue, which contains 376 pages, is 7/6, and it can be obtained from Whitfield King and Co., Ipswich, England, postage 7d.

New Stamps from Arabia

(*Con. f. p. 371*)

seen on the blue 2r. stamp. The remaining stamp in the series, the green 1r. value, shows Du' an, another provincial capital of Shihr and Mukalla.

All these stamps have inset a portrait of the Sultan of Shihr and Mukalla, the premier chief of the Eastern Aden Protectorate, and the ½a. green, ¾a. chestnut and 1a. deep blue stamps of the series show a portrait of His Highness. The inscriptions are in English and Arabic.

A similar scheme is followed in the stamps of the Kathiri State of Seiyun. The three lowest values carry a portrait of the Sultan, and the higher values have an inset portrait, with designs showing scenes in the country over which he rules. Seiyun, the capital and largest city, is seen on the red 1½a. stamp, and the blue 2½a. and orange 8a. values show a mosque in the city, decorated with seven rows of pillars. Probably the most interesting designs however are those on the 2a. sepia, 3a. sepia and carmine and 1r. green stamps, the two former of which are illustrated here, for they show scenes in Tarim, a very ancient walled city where alone the faith of the prophet Mahomet was maintained in the Hadhramaut in the troubled days after his death.

Tarim is still a city of religion, said to contain 360 mosques, of which 60 are claimed to be in use. In addition it is the richest city of the interior of the Hadhramaut, possessing most motor cars and telephones, and having electric light and radio, in addition to a cinema, although this is privately owned. Tarim helps to dispel the idea that the Hadhramaut States are comparatively uncivilised. They have indeed had many contacts with the outside world, for many thousands of Arabs have emigrated from them to Java and Malaya or to East Africa, and have grown rich by trade before returning to their homeland. There has also been a long and close connection between the Qu'aiti State and the rich native state of Hyderabad, in India.

One of the many mosques of Tarim is shown on the 2a. stamp, while the South Gate is shown on the 1r. stamp and a palace is pictured on the 3a. value. The palace is built in the Malayan style.

With the exception of two of the higher values, one for each State, the stamps have become available for collectors in short sets, as well as individually. They will be particularly welcomed by those who collect pictorials, or are principally interested in the stamps of the British Empire. For collectors who use loose-leaf albums, as we have always advised, their inclusion will offer no difficulty. Others can place them on a spare page, or include them in the Aden section.

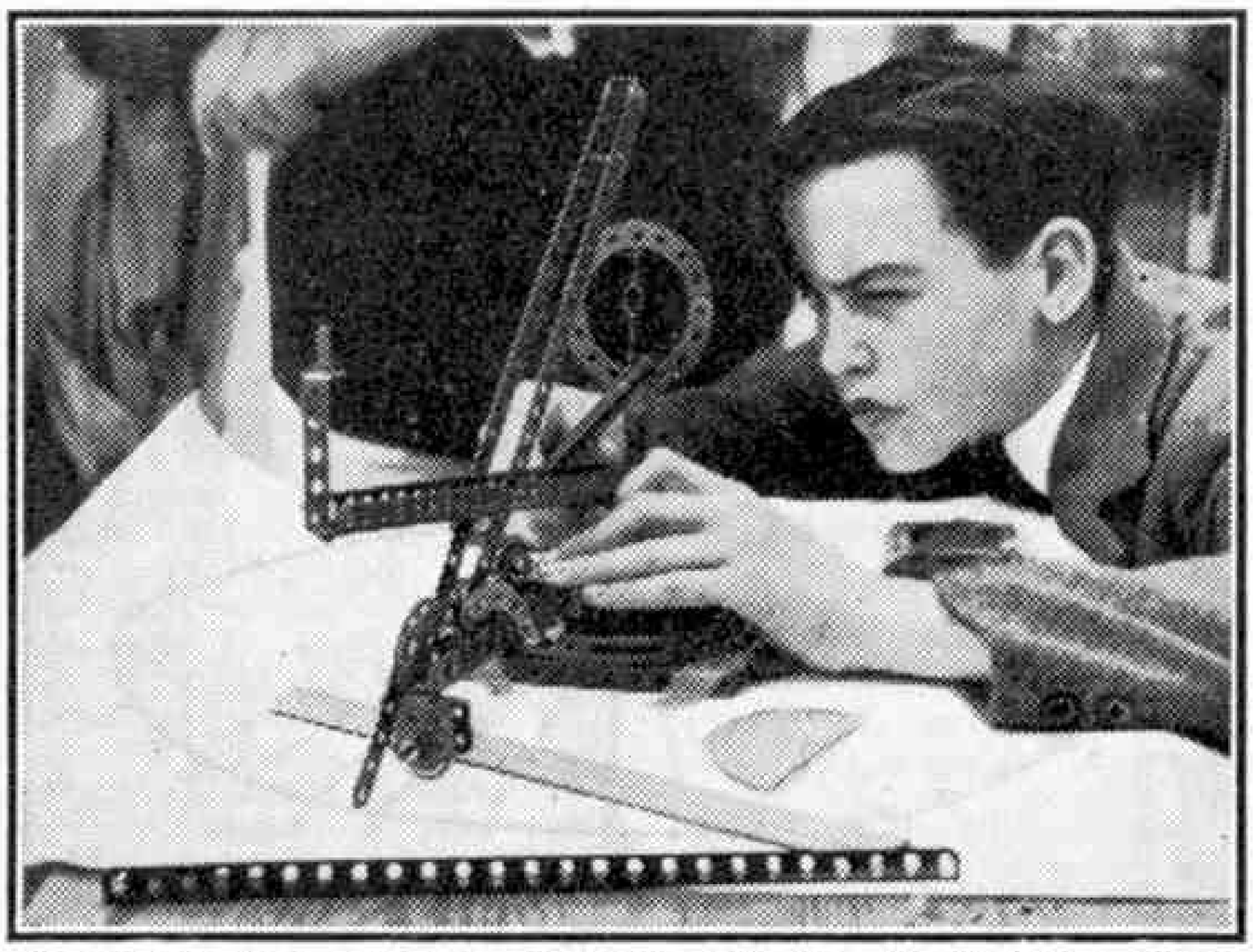
The L.M.S. Turbomotive No. 6202—

(*Continued from page 346*)

104 min., in spite of severe checking after Willesden, making the average 67 m.p.h. From Wolverton to London, 52.5 miles, No. 6202 took two minutes *less* than "*Duchess of Hamilton*" with "*The Coronation Scot*" during a run when I happened to be on the footplate of the latter engine—47 min. actually, though No. 6202 had a load 125 tons heavier.

These two runs were among the most interesting I have ever made on all sorts and conditions of locomotives in Great Britain, Canada and the United States. No. 6202 is a very fascinating engine, and because she is unique the experience was all the more worth while. The riding was good, but somewhat to my surprise it did not seem to me better than that of other members of her family, such as the "Princess Royals" and "Coronations." I had expected it to be rather like that of a sledge over snow! What disturbance there was could only have been due to track-reactions, as the turbine, with its perfect balance and even torque, does not give the slightest evidence of its presence, and creates no hammer-blow on the rails.

It was hoped that fuel-economy would be one of the engines advantages, but I cannot say whether this has been achieved or not, though certainly it is not extravagant. Mr. Stanier, the C.M.E of the L.M.S.R., the designer of No. 6202, kindly gave me details of two runs she made with "*The Royal Scot*," hauling over 480 tons, and the coal burned was only 40 to 42 lb. per mile, which is strikingly moderate. The average speed was over 55 m.p.h., and the maximum 85. Now that the inevitable little troubles always met with in a new type of engine have been got over, she gives very little bother, and the enginemen all seem to like her. So do I—and I hope that my readers will do the same now they have heard what a fine engine she is. May she live long and prosper!



Recruit Knight, still too young to join the Air Training Corps, using a home-made aircraft plotter built of Meccano.

Marine Engineers Examinations

The next examinations for admission as Students of the Institute of Marine Engineers will be held on 6th to 9th April and 5th to 8th October 1943. Those for admission as Graduates will be held on 31st May, 2nd and 4th June 1943, and for admission as Associate Members on 31st May to 7th June 1943. Syllabuses and other particulars will be supplied on application to the Secretary, Institute of Marine Engineers, 73, Amersham Road, High Wycombe, Bucks.

An examination for the award of a Lloyd's Register Scholarship in Marine Engineering, value £100 a year for three years, tenable at a British University, will be held on 31st May to 4th June, 1943. Candidates must be British subjects between the ages of 18 and 21, who have been employed in engineering, either as apprentices or as college students, with the intention of becoming marine engineers, and have served at least two years in commercial engineering workshops. Apprentices in H.M. Dockyards are not eligible. Full particulars may be obtained from the Secretary.

COMPETITION RESULTS

HOME

March "War Post" Contest.—1. D. Low, Norwich. 2. N. Sheppard, London W.3. 3. A. Cass, London W.14. Consolation Prizes: A. Batson, Hull; R. Lilly, Birmingham 27; M. Alston, London S.E.21; D. Eichenberger, London N.14.

March "Locomotive Pie" Contest.—L. Martin, Wallsend. 2. E. Smith, Manchester 21. 3. C. Wrayford, Bovey Tracey. Consolation Prizes: G. Reid Walker, Shifnal; G. Trattles, Leeds; R. Noakes, Ebley.

March "Photographic" Contest.—1st Prizes, Section A: P. Lang, Sevenoaks. Section B: J. Alker, Standish. 2nd Prizes, Section A: E. Barnes, Wembley Park; Section B: G. Barton, Birkdale. Consolation Prizes: A. Dell, London S.E.; J. Graeme Scott, Burnley; P. Edwards, Ashtead.

June "What Train Parts are These" Contest.—1. R. M. Haines, Hove 4. 2. C. E. Wrayford, Bovey Tracey. 3. J. Barnfather, Basingstoke. Consolation Prizes: R. W. Cole, Lewes; B. Bedford, Ruislip; F. A. Johnson, Walthamstow, E.17.

July "Railway Quiz" Contest.—1. J. C. Searle, Bournemouth. 2. T. Lawlor, Ilford. 3. C. E. Wrayford, Bovey Tracey. Consolation Prizes: D. M. Sutcliffe, Sheffield 11. D. Barlow, Stanmore; G. Roberts, Liverpool 11.

July "Errors" Contest.—1. P. Hoskins, Bristol 3. 2. B. Stocken, Gloucester. 3. J. R. Davey, Reading. Consolation Prizes: G. Smith, Northampton; J. W. Preston, Dorking; C. J. Smith, Purley.

July "Photo" Contest.—1st Prizes, Section A: G. Geramill, Burnley. Section B: A. G. Oglow, Launcester. 2nd Prizes, Section A: A. Benr tt, St. Neots. Section B: H. F. Rothechild, Pudleston. Consolation Prizes: C. B. Stevens, Hanley; H. C. Prudden, Bedford; M. S. Lee Browne, Redsombe College; H. Chase, Rotherham; F. Barr, Birkenhead.

OVERSEAS

February "Hidden Word" Contest.—1. B. Wallace, Toronto 12. 2. F. Jowett, Toronto. 3. S. Williams, Auckland.

February "Crossword" Puzzle.—1. P. A. Gibbs, Durban. 2. F. I. Macadam, Buenos Aires. 3. J. M. Demanuele, Victoria, Malta.

February "Photo" Contest.—1st Prizes, Section A: J. M. Demanuele, Malta. Section B: N. Jameson, Toronto. 2nd Prizes, Section A: O. Keef, Rayleigh Mount, B.C. J. Norman, Auckland, N.Z.

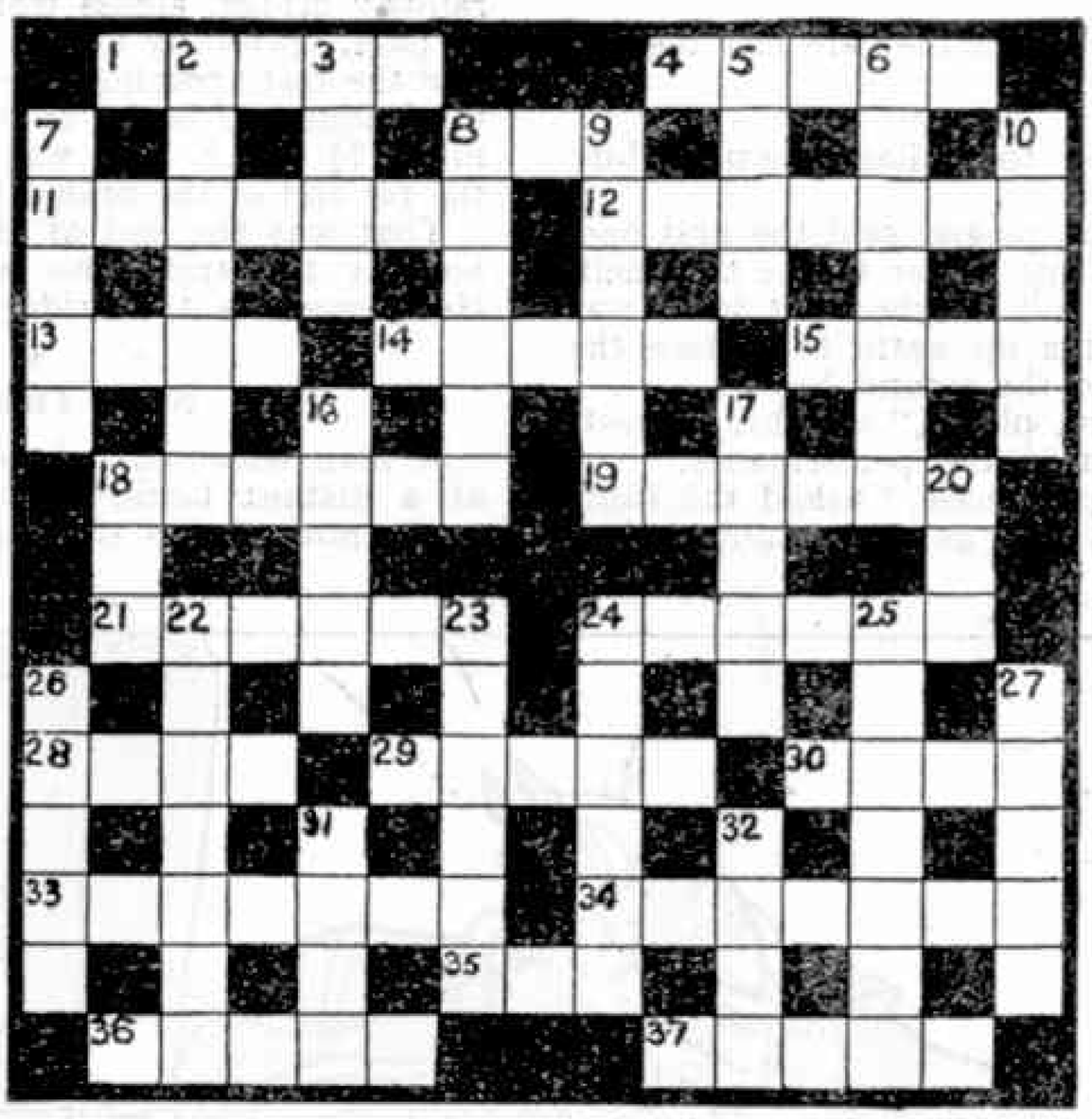
March "War Post" Contest.—1. J. M. Demanuele, Victoria, Malta. 2. I. Eugene, Wyang, N.S.W. 3. G. Myburgh, Claremont, S.A.

April "Advertisement" Contest.—1. M. Munro, Woodville, H.3. 2. M. Graham, Cape Province. 3. M. P. Laubscher, Johannesburg.

April "Photo" Contest.—1st Prizes, Section A: E. Byburgh, Malta. Section B: T. Morag, Cairo. 2nd Prizes, Section A: S. Stanbutt, Johannesburg. Section B: R. Bunburgh, Quebec.

Competitions! Open To All Readers

October Crossword Puzzle



ACROSS

1 Concise
4 Respond
8 Title
11 Instrument
12 Dusk
13 Meat
14 Fruit
15 Corrode
18 Account
19 Eats away
21 Plaid
24 Examined
28 Assert
29 Tale
30 Roster
33 Popular singer
34 Permanent
35 Before
36 Latin-American peasants
37 Sea-water

DOWN

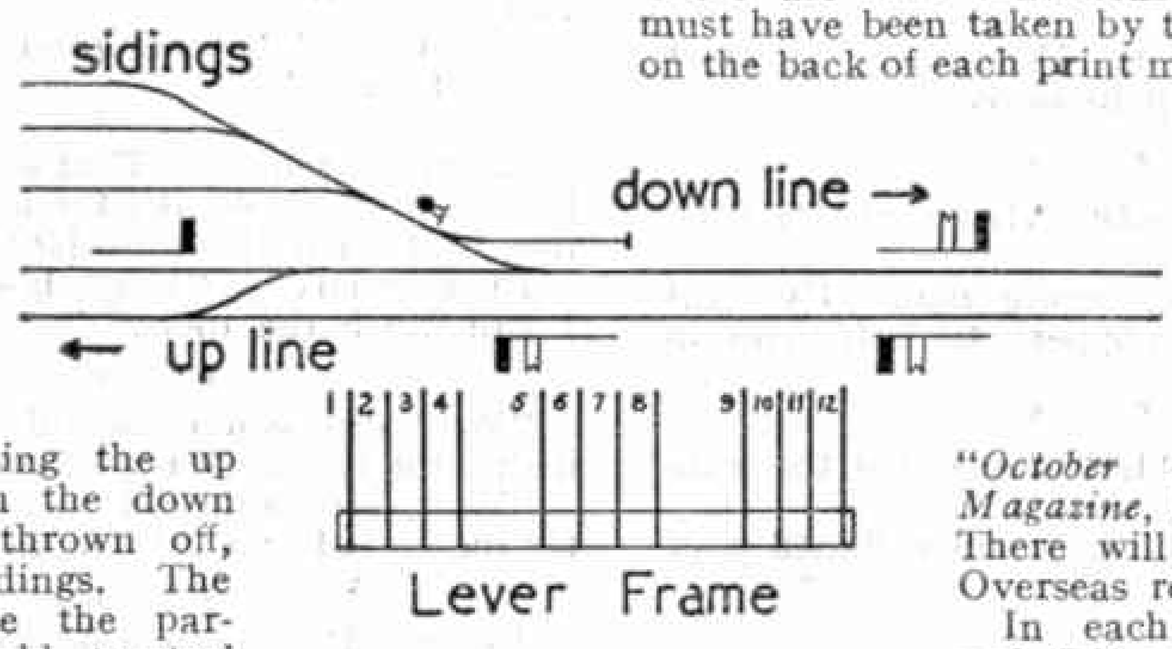
2 Strive to equal
3 Undermines
5 Always
6 Free time
7 Staff
8 Road
9 Rest
10 Precious stone
16 Grimy
17 Awaken
18 Rodent
20 Sorrowful
22 Flower
23 Character
24 Dove
25 Feeling
26 Relish
27 Great
31 Presently
32 Employer

Again we give our readers one of our straightforward crossword puzzles. It is contributed by a reader, T. K. Chaplin, and every word in it can be found in standard dictionaries. The competition is divided into sections for Home and Overseas readers, in each of which prizes of 21/–, 10/6 and 5/– will be given for the best solutions. If necessary the judges will take neatness and novelty into consideration when making their awards. Consolation prizes will be given for other meritorious efforts.

Entries should be addressed *"October Crossword Puzzle, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section: 31st October; Overseas Section: 28th February, 1943.

A Signalling Competition

Most readers, and especially H.R.C. members, are familiar with the general principles of signalling. Our competition this month gives them a chance to show how they would act if they were in the position of a signal engineer with the task of arranging the connections between the signals and points shown in the accompanying diagram and the lever frame.



The layout consists of a length of double track main line, with crossover points connecting the up and down tracks. From the down track there is a yard thrown off, consisting of several sidings. The problem is to determine the particular levers that would control each set of points and each signal. All that is required is to make a copy of the layout and to mark opposite each point and signal a figure corresponding with that on the lever selected to operate it. The diagram must not be cut out.

The Contest will be divided into the usual two sections, for Home and Overseas readers respectively, and in each section there will be prizes of 21/–, 10/6 and 5/–. Entries should be addressed *"October Signalling Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 31st October; Overseas Section, 28th February, 1943.

October Photographic Contest

This month's photographic contest is the 10th of our 1942 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed *"October Photo Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be separate sections for Overseas readers.

In each section prizes of 15/– and 7/6 will be awarded, together with consolation prizes for good efforts. Closing dates: Home Section, 31st October; Overseas Section, 28th February, 1943.

COMPETITION RESULT

HOME

August "Photo." Contest.—1st Prizes, Section A: B. Chulindra, Wadebridge. Section B: C. J. Dawson, London. 2nd Prizes, Section A: J. T. Temple, Edinburgh. Section B: P. C. Fletcher, Leicester.

Other Competition Results on page 374.

Fireside Fun

Small Boy: "Please give me another box of those pills I got for my mother yesterday."

Chemist: "Certainly. They did her a lot of good, did they?"

Small Boy: "I don't know, but they are just the size for my airgun."

* * * *

Four small boys entered the village shop to buy sweets.

"Penn'orth o' pear drops, please, said the first one.

The shopkeeper climbed his ladder to the top shelf, brought down the bottle and weighed out what was wanted, afterwards climbing up again to replace the bottle. Then he turned to the second boy.

"Penn'orth o' pear drops, please," was his request, and the shopkeeper repeated the performance.

"Penn'orth o' pear drops, please," asked the third boy. The shopkeeper was now getting annoyed, but he said nothing until he had weighed out the pear drops. Then he turned to the smallest boy, who was still waiting.

"I suppose you want a penn'orth o' pear drops too," he said sarcastically.

"No, sir," was the meek reply, so the shopkeeper once more climbed the steps to replace the bottle, and then came down again.

"Now, what do you want, sonny?" he asked pleasantly.

"A ha'porth of pear drops, please."

* * * *

Visitor: "What time is it?"

Native: "Twelve o'clock, sir."

Visitor: "Is that all? I thought it would be more than that."

Native: "No, sir, it never is. Down here we start again at one when we get up to twelve."

* * * *

Bus Conductor (in blackout): "Here, what's this? A torch or a penny?"

Old Lady: "It's all right, young man. I've put luminous paint on all my coppers to help you in the dark.

* * * *

"Who's waiting at this table?" demanded the irate customer.

"You, madam," said the busy waitress, "until your turn comes."

* * * *

Inquisitive Youth: "Hey, Bill, what takes your father into town every day?"

Bill: "The 9.0 train."

* * * *

Phyllis: "I can't understand why that office manager didn't give me the job."

Pattie: "What did he ask you?"

Phyllis: "He wanted to know if my punctuation was good."

Pattie: "And what did you say?"

Phyllis: "I told him I'd never been late for work in my life."

BRAIN TEASERS

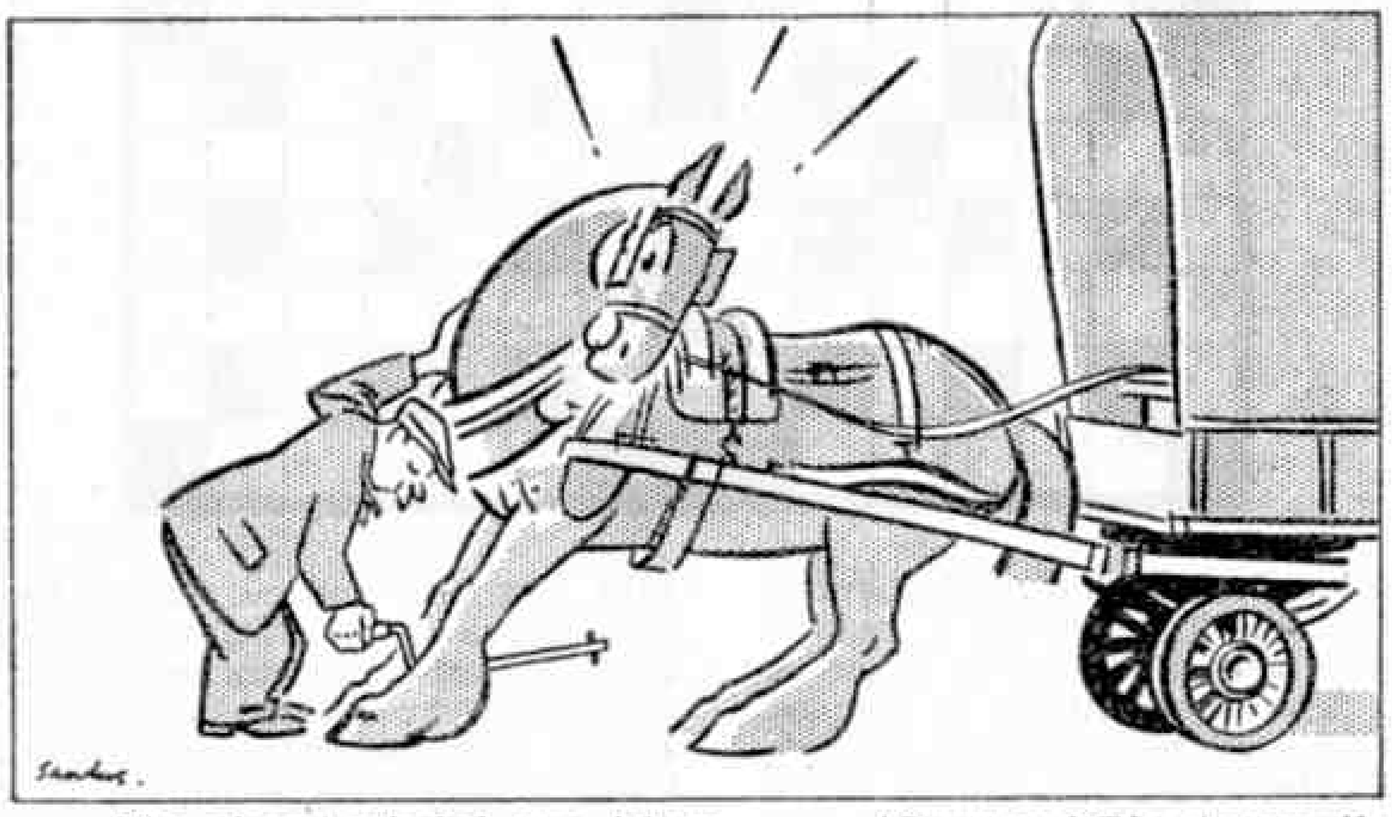
A cow stood 8 ft. from the centre of a single line railway bridge, across which a goods train was about to pass, travelling at the rate of 30 m.p.h. The cow saw the train coming when it was some distance from the bridge and began to run away, but she could only make 7½ m.p.h. and was overtaken 1 ft. 8 in. from the far end of the bridge.

That was the end of the cow, but if she had run *towards* the train she would just have got clear. How long was the bridge?

* * * *

NOW TRY THIS ONE

A man who had been employed for a few months at a distant factory, and cycled to and from his work, noticed one day that his speedometer showed that he had travelled exactly 1,243 miles. How far was his home from the factory? (T.K.C.)



The absent-minded van driver. *(Courtesy "The Autocar.")*

* * *

THE CENSOR'S LITTLE JOKE

Here is a mysterious note scribbled by a censor on a letter:

R F R N C
S T O S C
R T S A R
D L T D

It can be read on inserting the same vowel in 10 different places. What is the vowel and what does the note say? (T.K.C.)

* * * *

"Yes sir," said the waiter. "This is the best restaurant in town. If you ask for a fresh egg, you get the freshest in the world. If you want tender chicken, you get the most tender chicken we can find . . . . ."

"That's bad," interrupted the diner. "I've ordered a small steak."

* * * *

Angry Foreman: "That's the third shovel you've broken to-day. What's the idea of whaling into things like that with the shovels?"

Brawny navvy: "Easy, boss. Give me the job and I will finish the tools."

* * * *

"Why did you come off that horse?" yelled the instructor in the riding school, angrily.

"Well, sergeant, did you see anything in the air for me to hold on to?" replied the fallen cavalryman.

* * * *

Jones: "I've been told that wild beasts in the African forests won't harm anyone carrying a lighted torch. Is that true?"

Explorer: "Quite true if you can carry the torch fast enough."

* * * *

Tommy: "Can I stay away from school to-day? I've got a pain."

Mother: "Oh dear. Where do you feel the pain?"

Tommy: "In school."

* * * *

THIS MONTH'S HOWLER

An average is something that hens lay their eggs on.

Your choice is easy..

In the interests of national economy and to save rubber, Dunlop are concentrating all their production facilities on an "all-purpose" cycle tyre. It is a thoroughly reliable tyre, specially designed to meet war-time needs, and all the Dunlop technical knowledge and research have been applied in its design and production. Ask for it at your dealer's.

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★ *The existing range of DUNLOP CYCLE TYRES is, for the time being, discontinued.*

2H/312

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PERISCOPES. Ex Gov't. Folding trench Mark III opens to 25 in. x 4½ in. x 3 in., in canvas case with strap, **12/6**. Postage 1/–.

FOOT SWITCHES. 5 amp on-off snap for motor control, **5/–**. Couplings for motor or dynamo, **5/–** pair.

PLUGS. Midget 2-pin Battery type, **5/–** doz. Socket panel pairs, **8d.**, or 5 pairs mounted, **3/–**. 5-pin plug, socket and cord, **4/6**. 14-way ditto, **7/6**.

DYNAMO BARGAINS. Rotax, 6/12 volts 8½ amps. D.C. 3rd brush, size 8 in. x 4½ in., 11 lbs. Cost £10, unused, **17/6**, carriage paid. G.E.C. double current dynamos, 6 volts and 600 volts, ball-bearings, 17 lbs., as new, **27/6**, carriage paid.

LOUDSPEAKERS. Mov. Coil, Perm. Magnet, 5¼ in. and 6½ in., Celestion, blitzed cone for home repair, **7/6**.

8-WAY Lucas-Rotax Switch Boxes, 8 levers and fuses, for charging, etc., **3/6**. 6-way Push Button, R.A.F. Switches, **2/9**.

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Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICE:
LIVERPOOL 13, ENGLAND.
Telegrams: "Meccano, Liverpool."

Publication Date. The "*M.M.*" is published on the 1st of each month.

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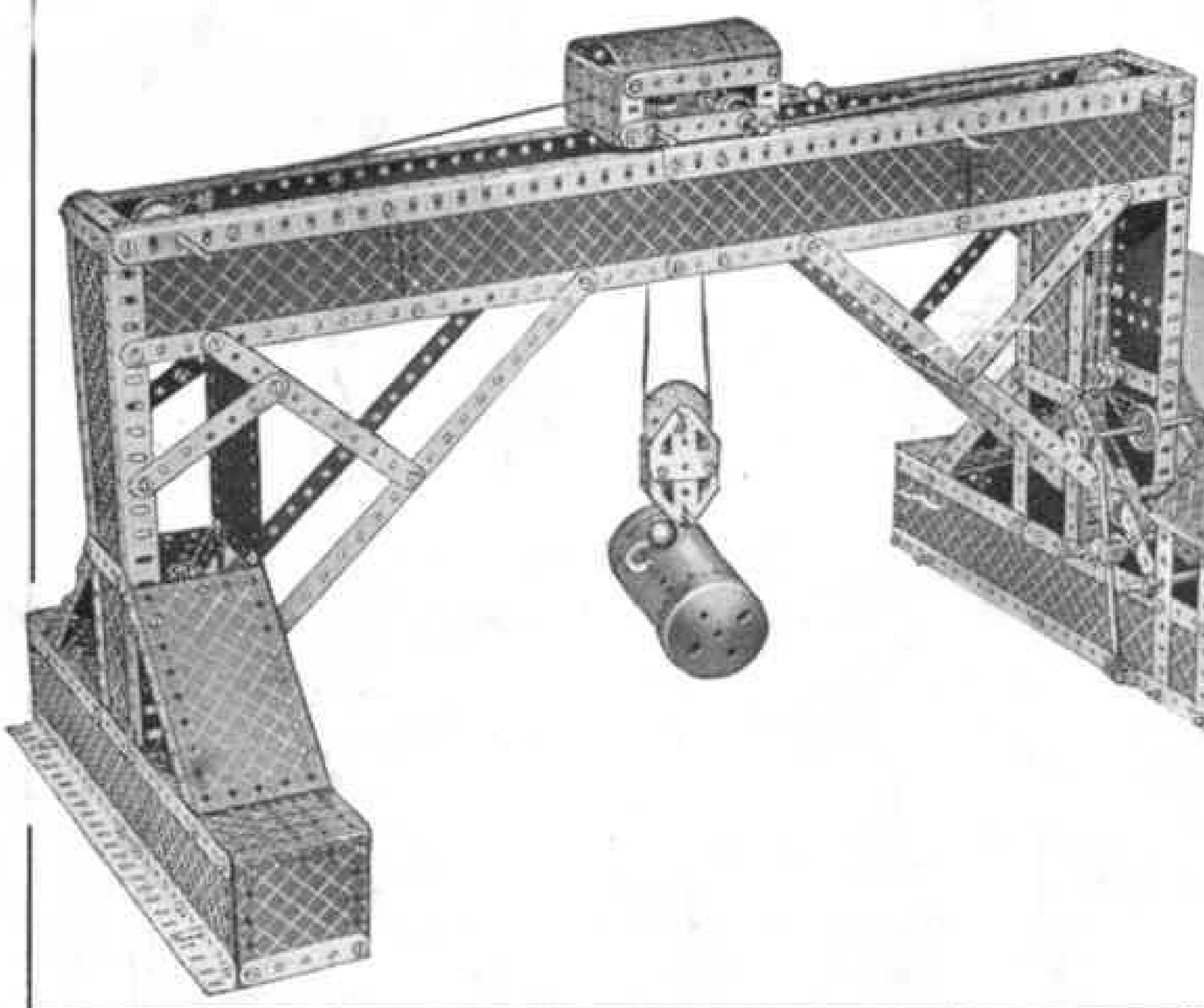

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PUBLISHED BY MECCANO LTD., BINNS ROAD, LIVERPOOL 13, ENGLAND.
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